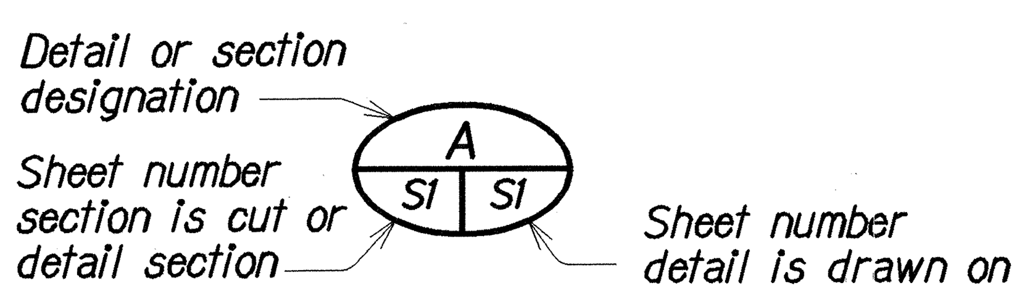
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(28)	2002	ADD.23	47

INDEX TO DRAWINGS

ABBREVIATIONS

AB	Anchor Bolt	FF	Front Face	PL	Plate
Abut.	Abutment	Fin.	Finish	R	Radius
Alum.	Aluminum	Ga.	Gage, gauge	Rdwy.	Roadway
Approx.	Approximate	Galv.	Galvanized	Ref.	Reference
BL	Baseline	gdi	Exist. grated drop inlet	Req'd	Required
Bal.	Balance	Gr.	Grade	Reinf.	Reinforcing
Beg.	Begin, Beginning	Horiz.	Horizontal	sdmh	Exist. storm drain manhole
Bm.	Beam	HS	High Strength	Sect.	Section
Brg., Brgs.	Bearing, Bearings	IB	Inbound	Shld.	Shoulder
℄	Center line	Jt.	Joint	Sht.	Sheet
CBC	Concrete Box Culvert	L	Length	Spcs.	Spaces
cdi	Exist. conc. drop inlet	LC	Length of Curve	Spcg.	Spacing
Cl.	Clear	Lg.	Long	Sta.	Station
Col.	Column	Longit.	Longitudinal	Std.	Standard
Conc.	Concrete	Max.	Maximum	Struct.	Structural
Cont.	Continuous	Min.	Minimum	Str.	Structure
CR	Corrosion Resistant	No.	Number	T&B	Top and Bottom
Det.	Detail	NIC	Not In Contract	Thk.	Thick
Dia.	Diameter	oc	On Center	TS	Tubular Steel
Diag.	Diagonal	OB	Outbound	Typ.	Typical
Ea.	Each	OD	Outside Dimension	Vert.	Vertical
EF	Each Face			w/	with
EP	Edge of Pavement				
Eq.	Equal				
Exist.	Existing				
Exp.	Expansion				

SYMBOLS



GENERAL NOTES

DESIGN SPECIFICATIONS - AASHTO:

1. AASHTO LRFD Bridge Design Specifications, 1998, with 1999 interim revisions.

MATERIALS:

1. Reinforced concrete: f'c = 4,000 psi
2. Reinforcing steel: ASTM A 615, Grade 60.
3. Admixture in concrete: See Special Provisions
4. All expansion and premolded joint filler shall be incidental to concrete and will not be paid for separately.
5. All structural steel shall be ASTM A 36 hot-dip galvanized after fabrication.
6. All anchor bolts, washers and nuts shall be ASTM A 325, hot-dip galvanized after fabrication, unless noted otherwise.
7. All welding shall be in accordance with the current edition of Structural Steel Welding Code AWS D 1.1. Welding electrodes for structural steel shall be E 70.
8. Epoxy shall be "Double Cartridge" type with static mixer. Epoxies that require manual measuring or mixing will not be allowed. Epoxy shall meet the requirements of ASTM C 881, Type IV, Grade 3, Class C.
9. Dowels. Stainless Steel AISI 316L grade dowels shall either conform to ASTM A 955 Grade 60 or be stainless steel AISI 316L grade, clad dowels which meet the requirements of ASTM A 955 Grade 60 and have an average cladding thickness of 0.04 inches. If clad dowels are used then the ends of the dowels shall be sealed with epoxy as per Section 11 of ASTM A755.

CONSTRUCTION METHODS:

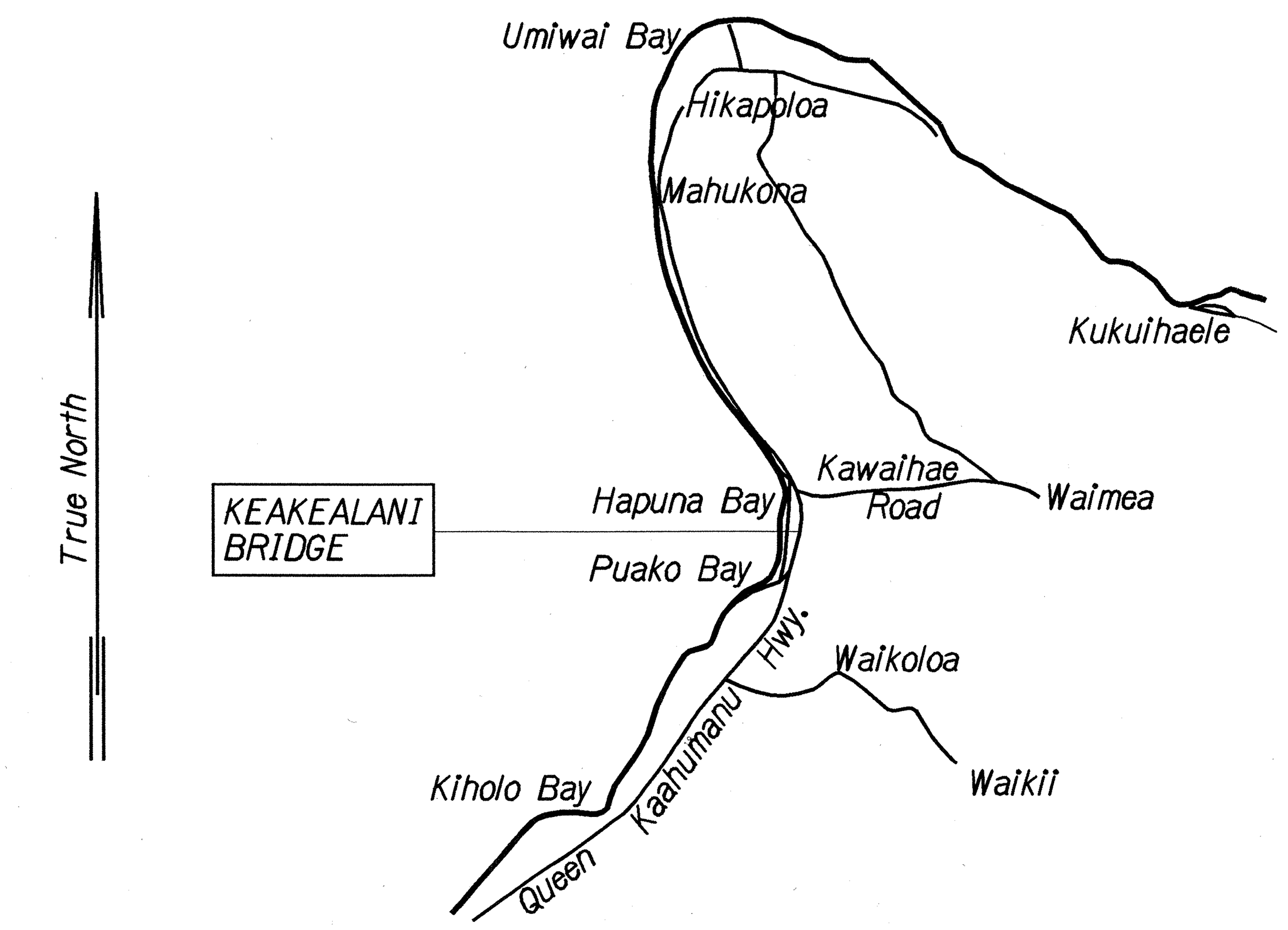
1. Refer to Hawaii Standard Specifications for Road, Bridge and Public Works Construction, 1994 Edition and Special Provisions.
2. Except as noted otherwise, all dimensions are measured plumb.
3. For concrete finish, see Special Provisions.
4. Steel reinforcing shall be supported, bent and placed as per the ACI Detailing Manual, 1994.
5. The minimum cover measured from the surface of the concrete to the face of any reinforcing bars shall be as follows, except as noted otherwise:
   a. Concrete cast or finished to a smooth surface: 2"
   b. Concrete cast against and permanently exposed to earth: 3"
6. At time concrete is placed, reinforcing shall be free from mud, oil, laitance or other coatings adversely affecting bond capacity.
7. Reinforcement, dowels and other embedded items shall be positively secured before pouring.
8. All existing reinforcing and anchor bolts that can be incorporated in the new work shall be cleaned before being utilized in the new work.
9. All existing concrete faces receiving new concrete in the finish product shall be roughened to a min. ¼" amplitude and cleaned prior to placement of the new pour.
10. Existing structure shown by dashed lines. Limits of removal of existing structure shown by x-hatched lines. Saw-cut 1" deep along cut line of existing structure. Removal shall be done in such a manner as to preclude any damage to the existing reinforcing and concrete to remain. Large vibratory type of equip,emt will not be permitted in the removal operation, nor for drilling of holes. Only small vibratory hand tools approved by the Engineer will be allowed. Any damage to the existing structure due to the ontractor's operation or negligence shall be repaired at his expense with no additional cost to the State, and to the satisfaction of the Engineer.
11. Large impacting or vibratory type equipment will not be permitted in the drilling of holes.
12. The holes for anchor bolts shall be drilled as shown into the existing concrete surfaces prior to fabrication of structural steel elements. If the drill contacts any existing rebar, the hole shall be filled with epoxy grout and a replacement hole shall be drilled. The Contractor shall not damage any existing rebars. Any damage by the Contractor shall be repaired at the Contractor's expense and at no cost to the State.
13. All dimensions relating to reinforcing bars (e.g. spacing of bars, etc.) are to centers of bars unless noted otherwise.
14. All existing reinforcing that can be incorporated in the new work shall be cleaned before being utilized in the new work.

REFERENCE:

1. Refer to Standard Plans for additional details and notes not covered by details and typical drawings.

GENERAL:

1. All items noted incidental will not be paid for separately.
2. The Contractor shall verify the locations of all existing utility lines and notify their respective owners before commencing with any work.
3. The Contractor shall verify all grades and dimensions in the field before commencing with any work.
4. The Contractor shall be solely responsible for the protection of adjacent property, utilities and existing and new structures from damage due to construction. Repairing any damage shall be at the Contractor's own expense, to the satisfaction of the Engineer. He shall conduct his work in such a manner and provide such temporary shoring or other measures as may be necessary to insure the safety of all concerned and to protect existing structures.
5. Unless noted otherwise, chamfer all exposed concrete edges three-quarters (¾) of an inch.



LOCATION PLAN

Not To Scale

DATE	REVISION
12/10/01	Plan Sheet No. ADD.23 shall supercede Plan Sheet No. 23 per Addendum No. 1.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEAKEALANI BRIDGE

INDEX, GENERAL NOTES, LOCATION PLAN, ABBREVIATIONS AND SYMBOLS

QUEEN KAAHUMANU HIGHWAY

Guardrail & Shoulder Improvement, Kawaihae to Hapuna

Project No. NH-019-1(28)

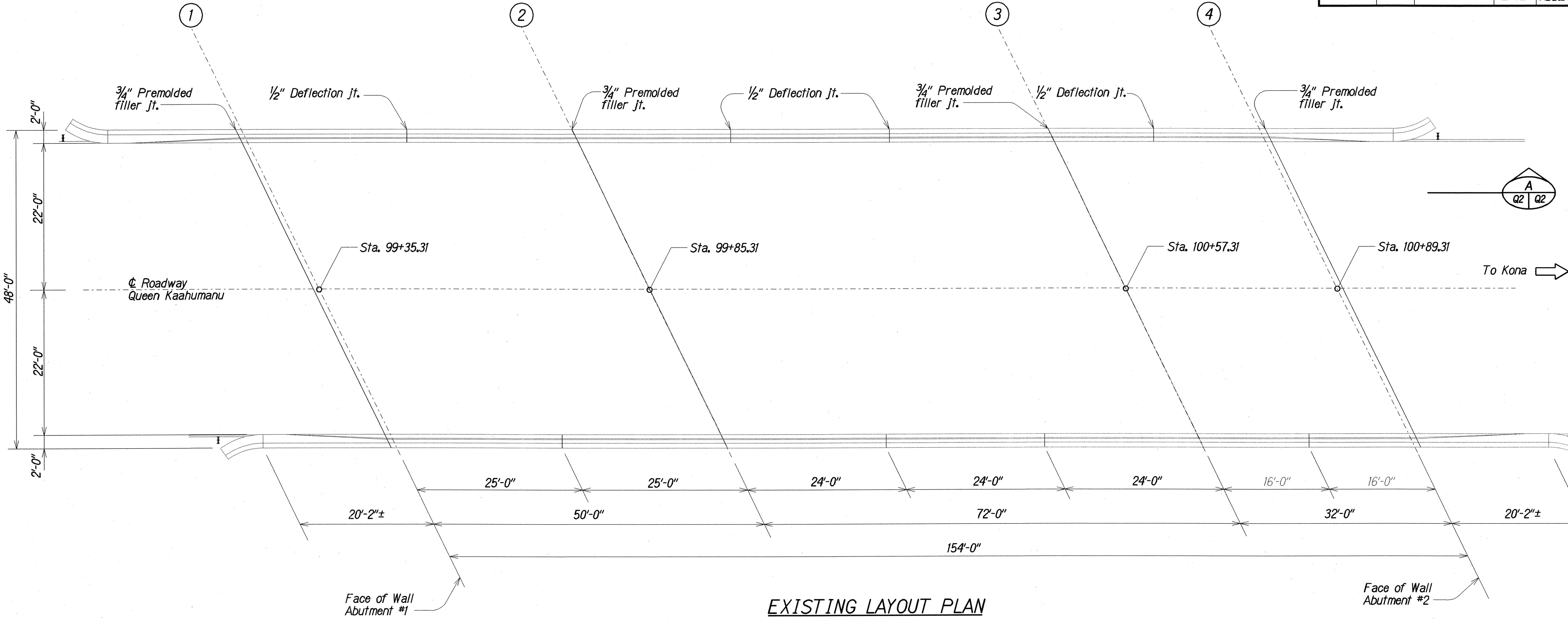
Scale: As Noted Date: Jul. 2001

SHEET No. Q1 OF 7 SHEETS

ADD.23

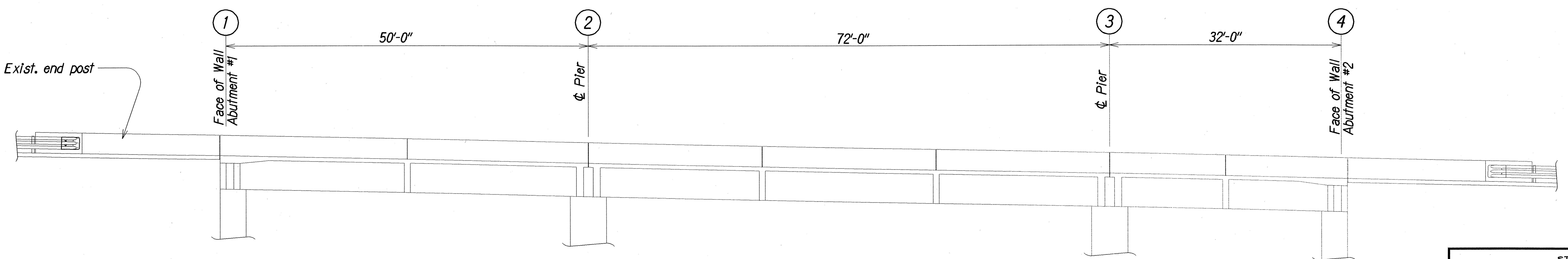
ORIGINAL PLAN	
SURVEY PLOTTED BY	DATE
DRAWN BY KMG	Jul 2001
TRACED BY	
DESIGNED BY DKT	Jul 2001
QUANTITIES BY DKT	Jul 2001
CHECKED BY PS	Jul 2001
NOTE BOOK No. bqkhabq1.dgn	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(28)	2002	ADD.24	47



EXISTING LAYOUT PLAN

Scale: ⅛"=1'-0"



LONGITUDINAL SECTION (A Q2 | Q2)

Scale: ⅛"=1'-0"

DATE	REVISION
12/10/01	Plan Sheet No. ADD.24 shall supercede Plan Sheet No. 24 per Addendum No. 1.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEAKEALANI BRIDGE
EXISTING LAYOUT PLAN
AND LONGITUDINAL SECTION

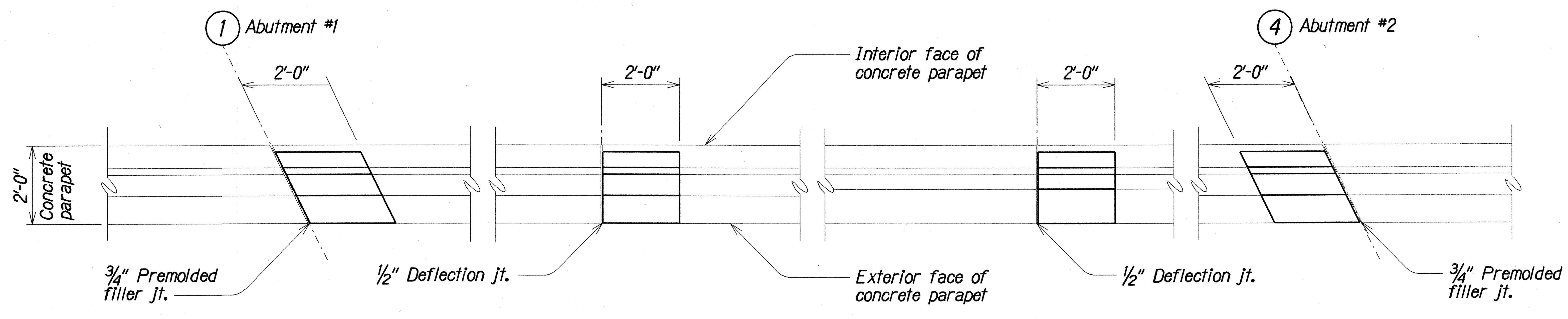
QUEEN KAAHUMANU HIGHWAY
Guardrail & Shoulder Improvement, Kawaihae to Hapuna
Project No. NH-019-1(28)

Scale: As Noted   Date: Jul. 2001

SHEET No. Q2 OF 7 SHEETS

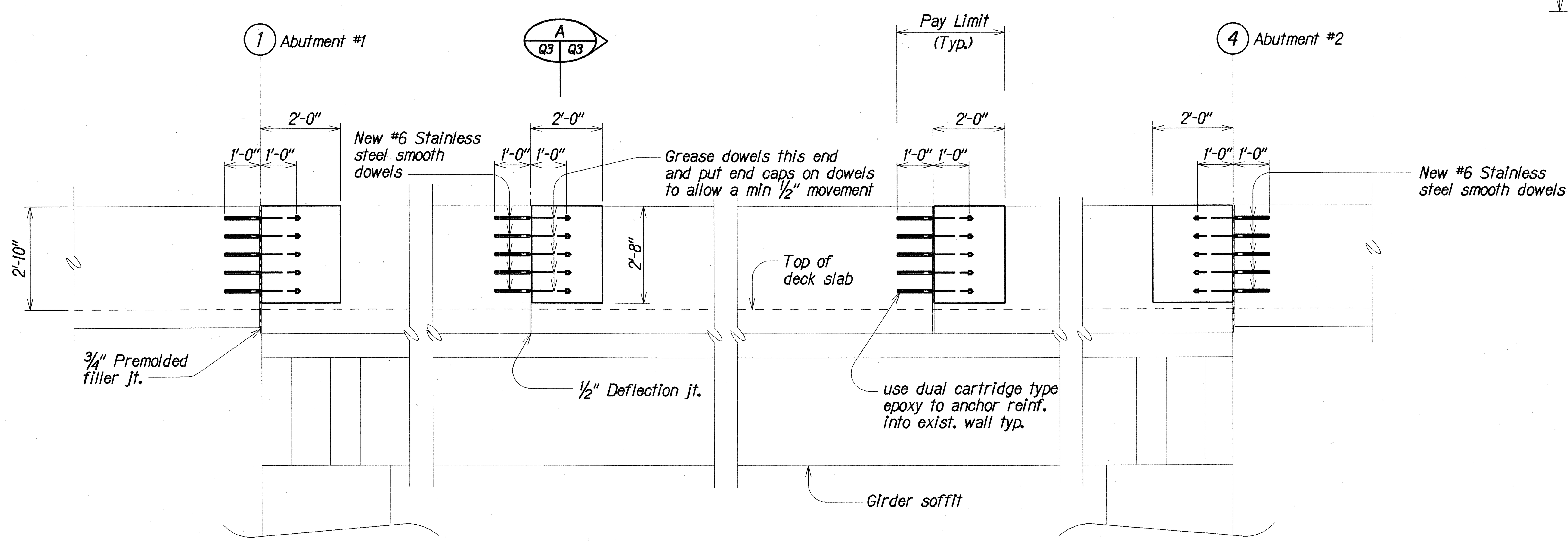
ORIGINAL PLAN		DATE
SURVEY PLOTTED BY	KMN	Jul. 2001
DRAWN BY		
TRACED BY	DKT	JUL 2001
DESIGNED BY	DKT	JUL 2001
QUANTITIES BY	PS	JUL 2001
CHECKED BY		
NOTE BOOK	bqkhabq2	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(28)	2002	ADD.25	47



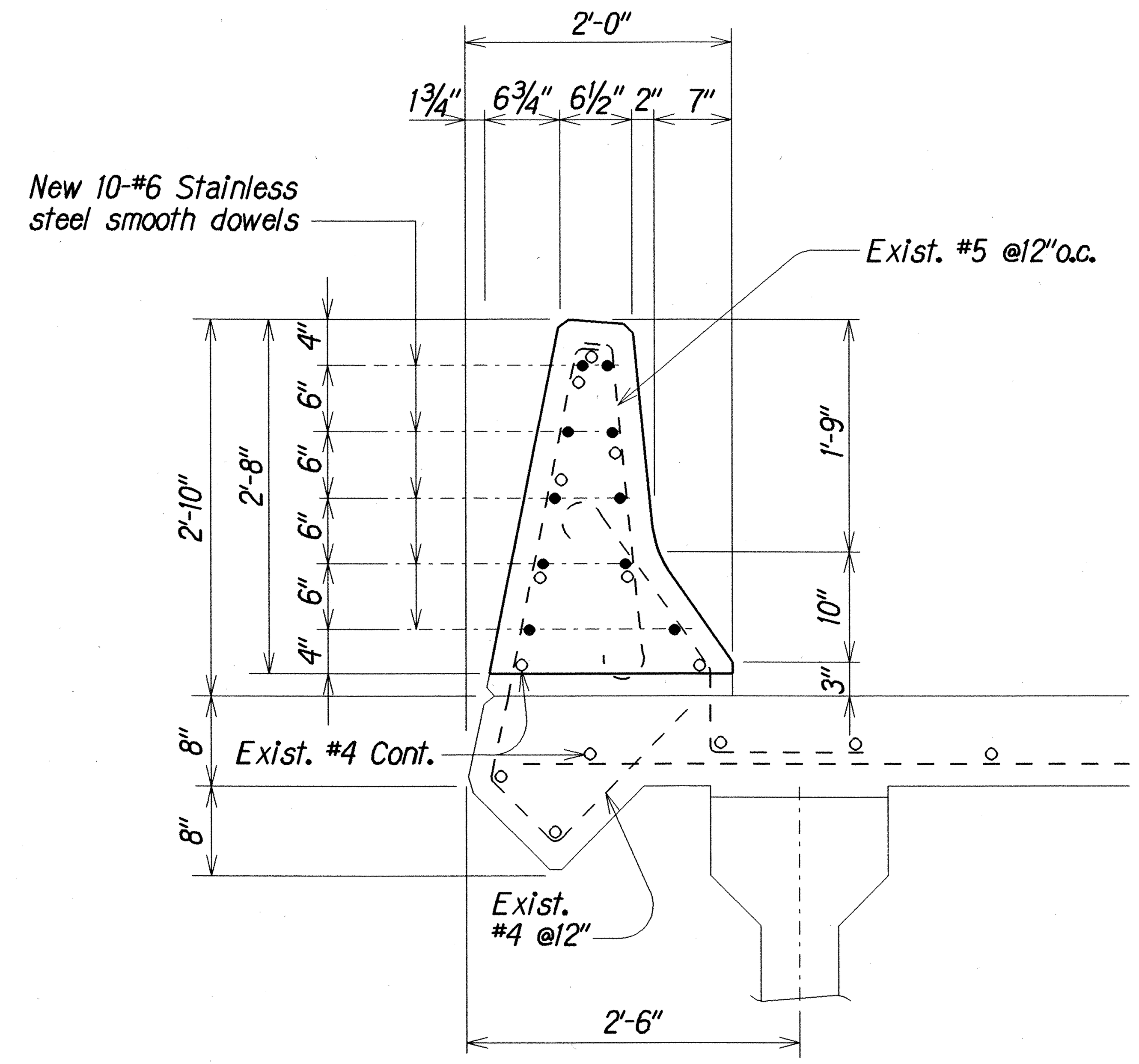
PARTAIL PLAN - EXTERIOR CONCRETE PARAPET

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



PARTIAL ELEVATION - EXTERIOR CONCRETE PARAPET

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



SECTION (A Q3 Q3)

Scale: 1"=1'-0"

NOTES:

1. Concrete removal to only occur on bridge parapet not on wingwall (endpost side) of joints at abutment.
2. #6 dowels to be either AISI 316L stainless steel or AISI 316L stainless steel clad.
3. Expoxy for dowels shall meet the requirements of ASTM C881 Type IV Grade 3, Class C.
4. Holes for dowels shall be 7/8" ø or as recommended by epoxy manufacturer.
5. Holes shall be blown clean with compressed air, brushed, then blown clean again with compressed air prior to placement of epoxy holes.

DATE	REVISION
12/10/01	Plan Sheet No. ADD.25 shall supercede Plan Sheet No. 25 per Addendum No. 1.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEAKEALANI BRIDGE
PLAN, ELEVATION AND SECTION OF CONCRETE PARAPET

QUEEN KAAHUMANU HIGHWAY
Guardrail & Shoulder Improvement, Kawaihae to Hapuna
Project No. NH-019-1(28)

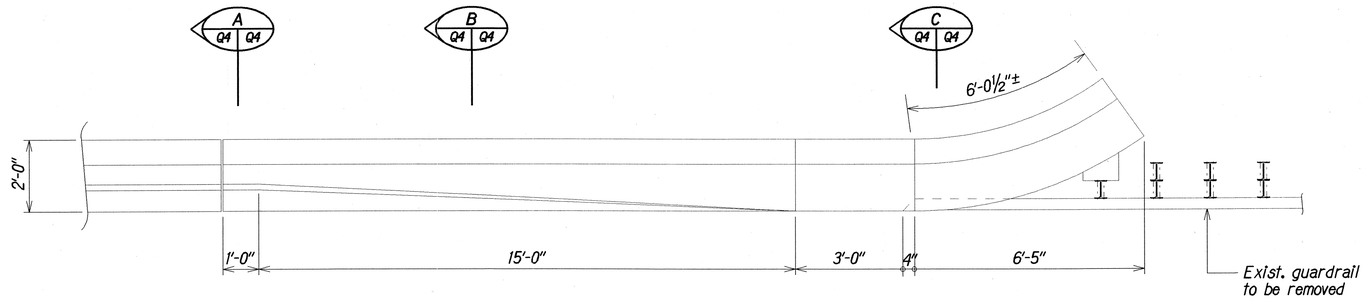
Scale: As Noted   Date: Jul. 2001

SHEET No. Q3 OF 7 SHEETS

ADD.25

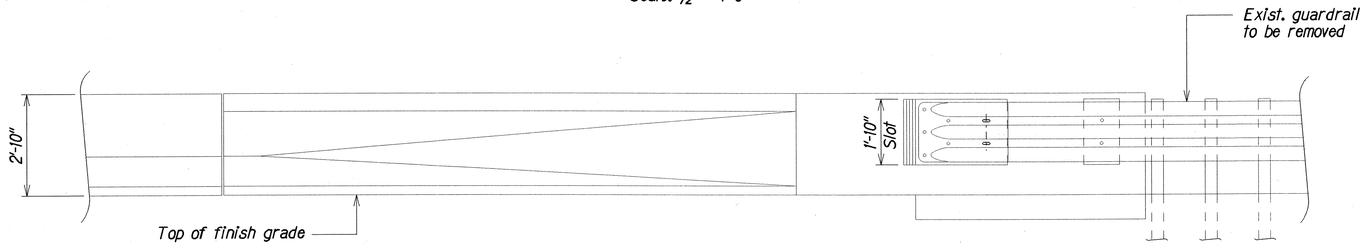
ORIGINAL PLAN	SURVEY PLOTTED BY / DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY	DATE
NOTE BOOK bdrhabq3 No. .dgn	KMN / DKT / DKT / PS	Jul. 2001

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(28)	2002	ADD.26	47



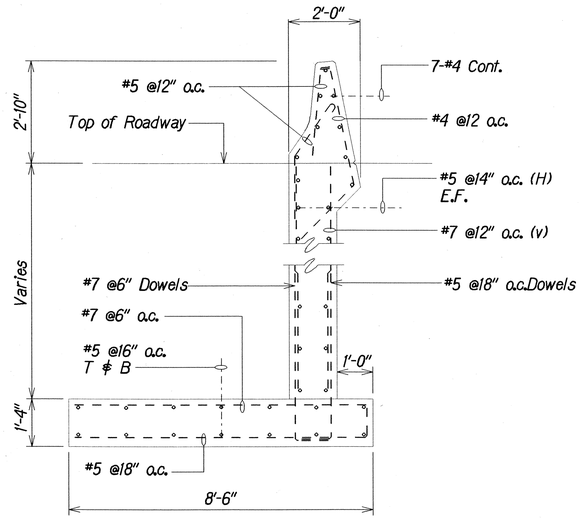
PLAN

Scale: ½" = 1'-0"



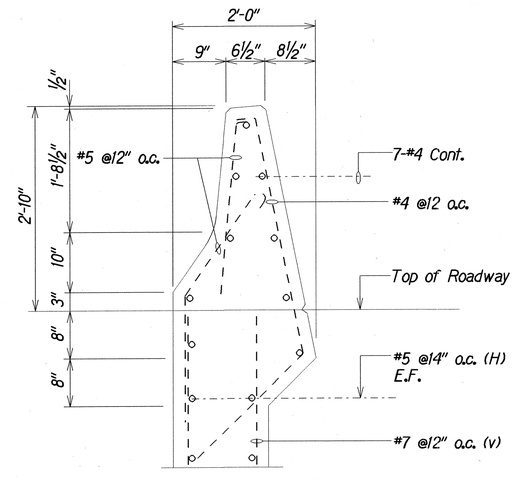
ELEVATION

Scale: ½" = 1'-0"



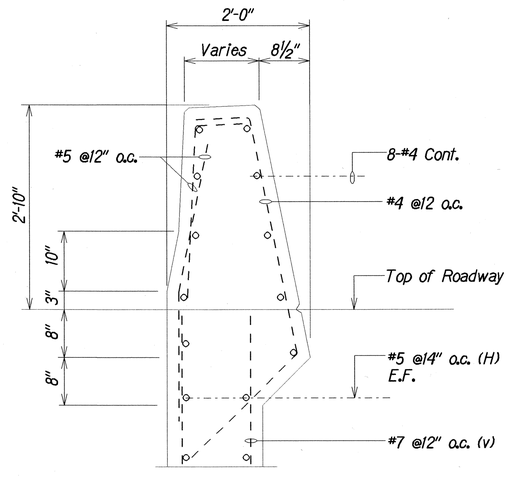
TYPICAL WING WALL SECTION

Scale: ½" = 1'-0"



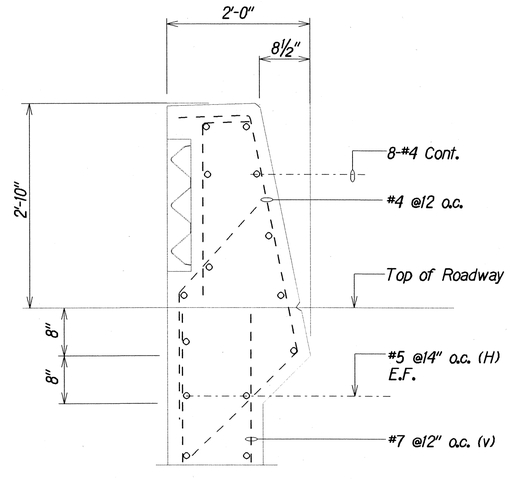
SECTION A Q4 Q4

Scale: 1" = 1'-0"



SECTION B Q4 Q4

Scale: 1" = 1'-0"



SECTION C Q4 Q4

Scale: 1" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	KMN	DATE	JUL 2001
	DATA BY			
NOTE BOOK DATED BY	TRACED BY	DKT		JUL 2001
	DESIGNED BY			JUL 2001
No. ADD	QUANTITIES BY	PS		JUL 2001
	CHECKED BY			

DATE	REVISION
12/10/01	Plan Sheet No. ADD.26 shall supercede Plan Sheet No. 26 per Addendum No. 1.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEAKEAKANI BRIDGE

EXISTING END POST

PLAN, ELEVATION AND SECTIONS

QUEEN KAAHUMANU HIGHWAY

Guardrail & Shoulder Improvement, Kawaihae to Hapuna

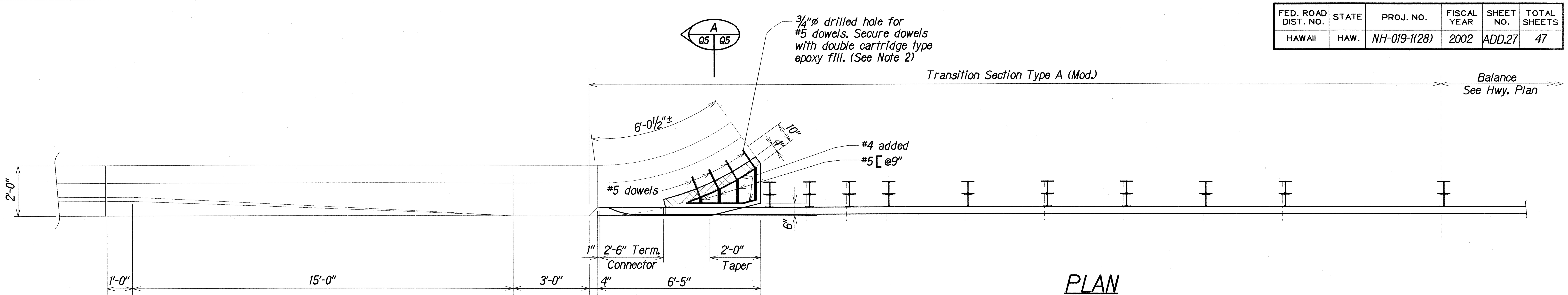
Project No. NH-019-1(28)

Scale: As Noted Date: Jul. 2001

SHEET No. Q4 OF 7 SHEETS

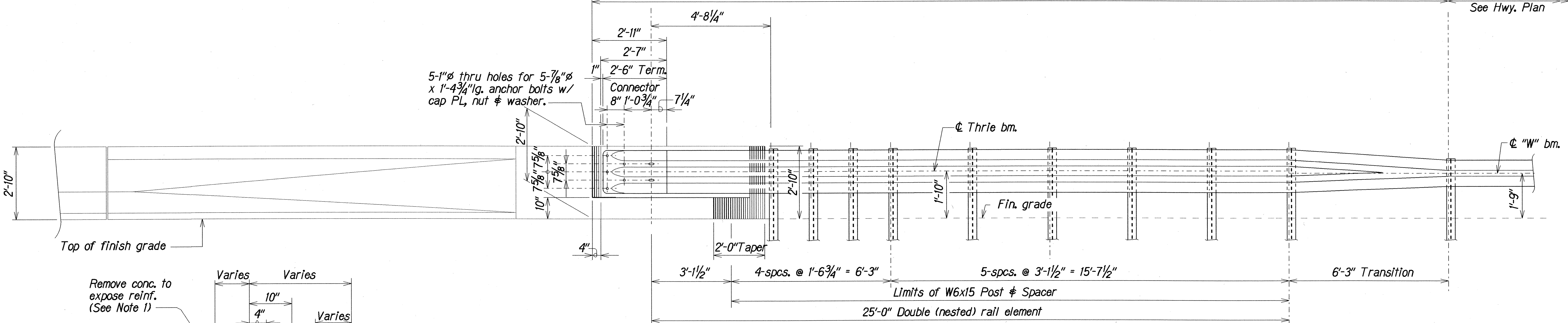
ADD.26

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(28)	2002	ADD.27	47



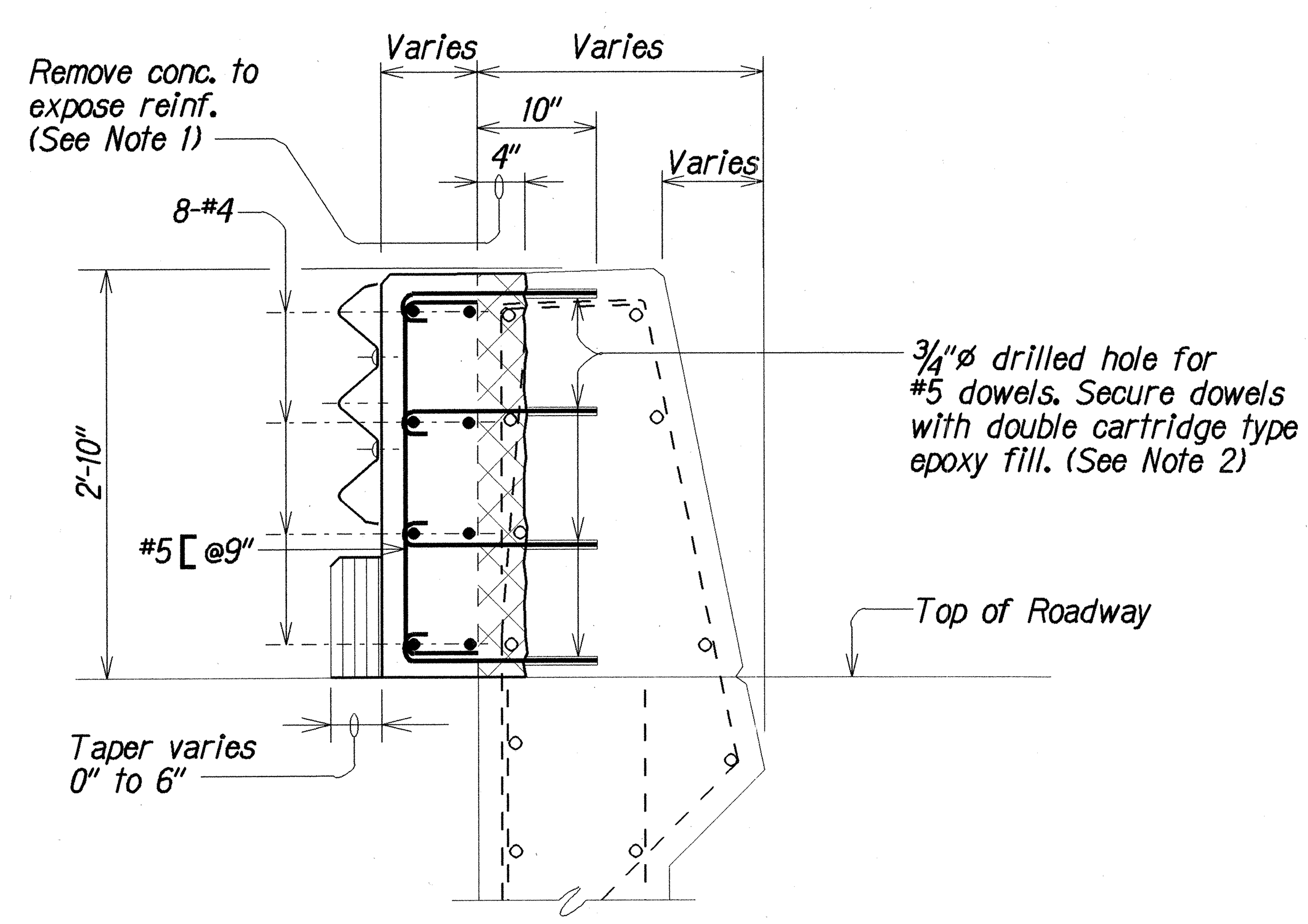
PLAN

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



ELEVATION

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



SECTION A (Q5 | Q5)

Scale: 1" = 1'-0"

NOTES:

1. Roughen existing concrete surface at limits of new concrete and apply epoxy adhesive prior to new concrete pour. Epoxy used to bond new to existing concrete shall meet ASTM C881, Type V, Grade 3 Class C.
2. Epoxy for new dowels shall meet ASTM C881, Type IV, Grade 3 Class C.
3. Payment for Item 606.7500 Transition Section Type A (Mod.) shall include all demolition, drilling, dowels, reinforcing, concrete, epoxy, guardrails, posts, terminal sections, materials, labor, tools and incidentals necessary to complete this work.
4. Concrete shall be Class A.

LEGEND:

[crosshatched box] Denotes existing concrete to be removed.

DATE	REVISION
12/10/01	Plan Sheet No. ADD.27 shall supercede Plan Sheet No. 27 per Addendum No. 1.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEAKEALANI BRIDGE

ENDPOST UPGRADE
PLAN, ELEVATION AND SECTIONS

QUEEN KAAHUMANU HIGHWAY

Guardrail & Shoulder Improvement, Kawaihae to Hapuna
Project No. NH-019-1(28)

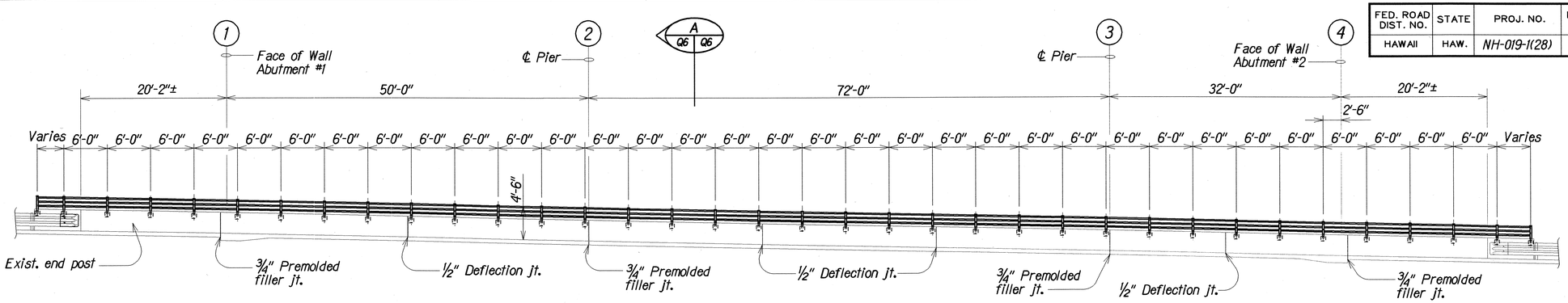
Scale: As Noted — Date: Jul. 2001

SHEET No. Q5 OF 7 SHEETS

ADD.27

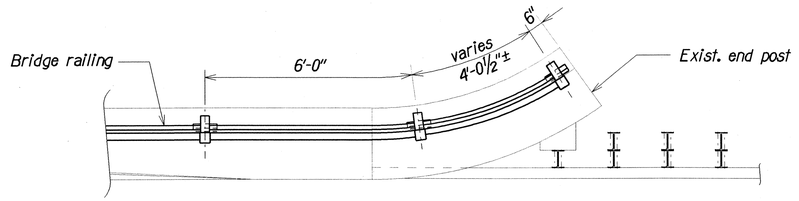
ORIGINAL PLAN		DATE
	SURVEY PLOTTED BY	
	DRAWN BY KMN	Jul. 2001
NOTE BOOK bqkhabq5	TRACED BY	
	DESIGNED BY DKT	Jul. 2001
No. .dgn	QUANTITIES BY DKT	Jul. 2001
	CHECKED BY PS	Jul. 2001

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(28)	2002	ADD.28	47



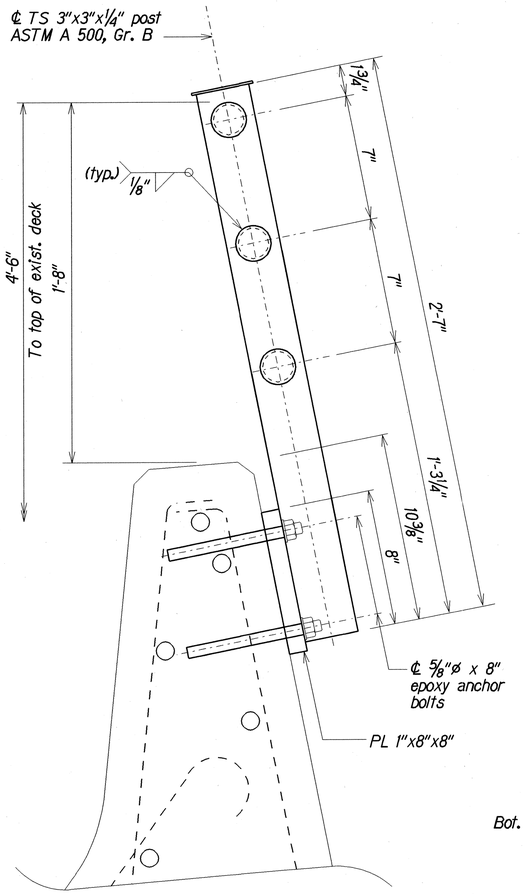
ELEVATION

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



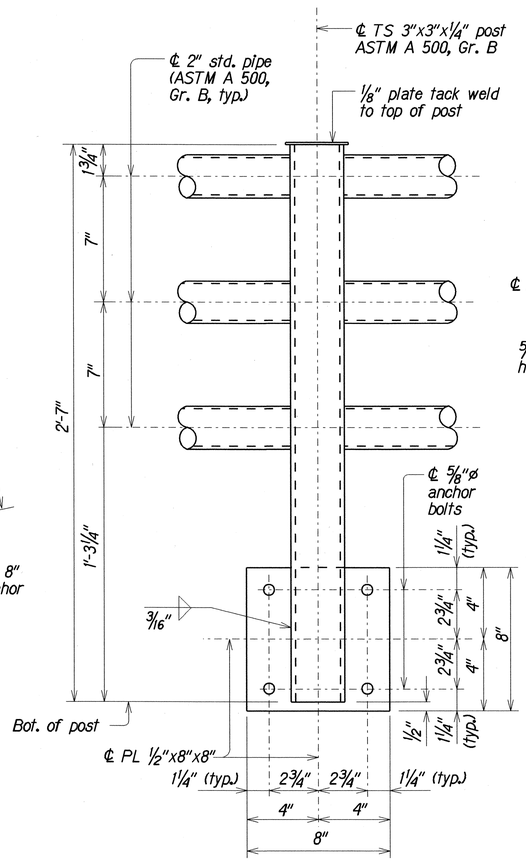
PART PLAN

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



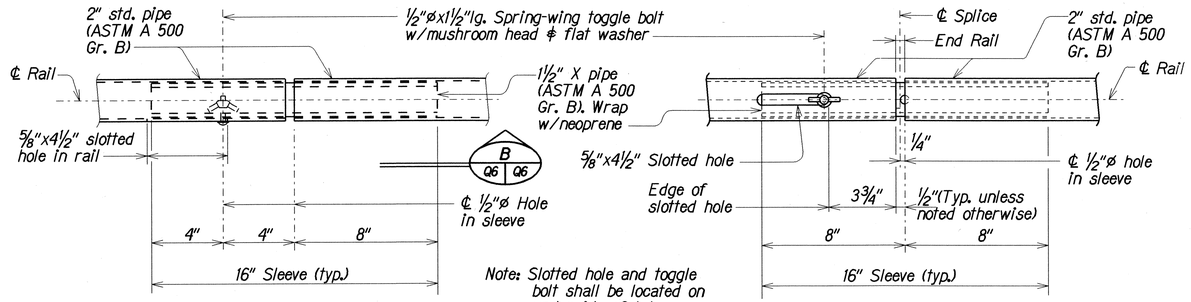
SECTION A (Q6 | Q6)

Scale: 3" = 1'-0"



ELEVATION (REAR FACE) ANCHOR PLATE DETAIL

Scale: 3" = 1'-0"



ELEVATION

SECTION B (Q6 | Q6)

TYPICAL TUBE SPLICE DETAILS

Scale: 3"=1'-0"

BRIDGE RAILING UPGRADE

NOTES:

1. Take splices over open joint in rail and at end of bridge, at bridge joint, between bridge rail and end post joint should be placed as close as possible to post.
2. Epoxy for new #5 rebars and anchor bolts and shall meet ASTM C881 Type IV Grade 3 Class C.

DATE	REVISION
12/10/01	Plan Sheet No. ADD.28 shall supercede Plan Sheet No.28 per Addendum No. 1.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEAKEAKANI BRIDGE
BRIDGE RAILING UPGRADES
QUEEN KAAHUMANU HIGHWAY
Guardrail & Shoulder Improvement, Kawaihae to Hapuna
Project No. NH-019-1(28)

Scale: As Noted Date: Jul. 2001

SHEET No. Q6 OF 7 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	KMN	Jul. 2001
	DRAWN BY		
	TRACED BY	DKT	Jul. 2001
NOTE BOOK	DESIGNED BY	DKT	Jul. 2001
No. dgn	QUANTITIES BY	PS	Jul. 2001
	CHECKED BY		

ADD.28

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(28)	2002	ADD.29	47

NOTES:

A. 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 will not be paid for separately.

B. Lap terminal connector and rail element in direction of traffic to prevent snagging.

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

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

E. "Terminal Connector", "Transition Section" and thrie beam shall be fabricated from 10gauge steel conforming to the requirements of AASHTO M 180, Type II, Class B.

F. "Terminal Connector" and standard spacer, including all anchor bolts, cap PL, nuts and washers, shall be hot-dip galvanized after fabrication.

G. Cap PL shall be fabricated from ASTM A 36.

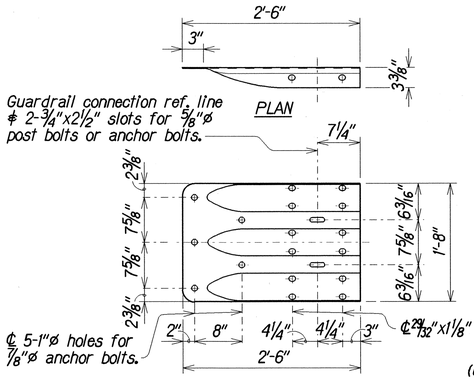
H. First 25'-0" of guardrail adjoining "Terminal Connector" shall be galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to end post or parallel to roadway, unless conditions at site renders it impossible to do so. Flare point to be determined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

I. Double (nest 1st panel) thrie beam elements at all end post connections, except on highways with one-way traffic pattern, use single thrie beam elements at end post on trailing end only.

J. Where double (nested) beam occur, 12" "Back-up Plate" not required.

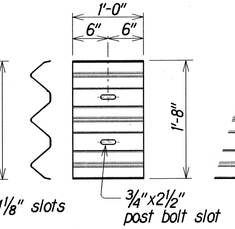
K. Heads of through anchor bolts shall be placed on the traffic side of the rail.

L. All steel shapes, rails and plates shall conform to ASTM A 36 specifications.



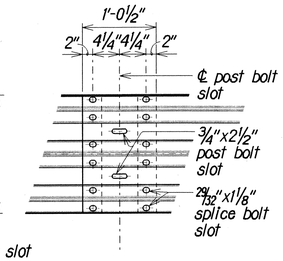
TERMINAL CONNECTOR

Scale: 1" = 1'-0"



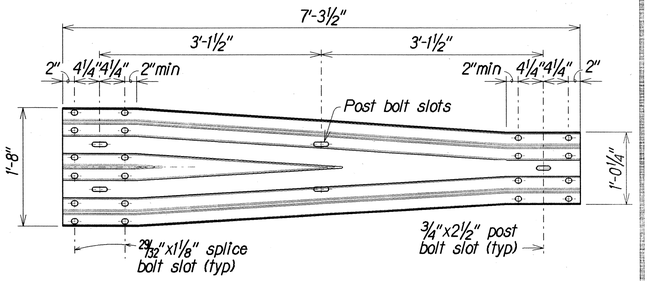
BACKUP PLATE

Scale: 1" = 1'-0"



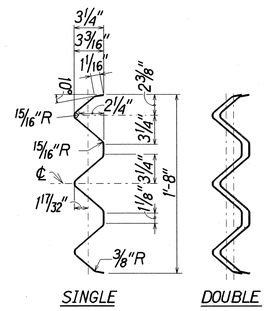
RAIL SPLICE

Scale: 1" = 1'-0"



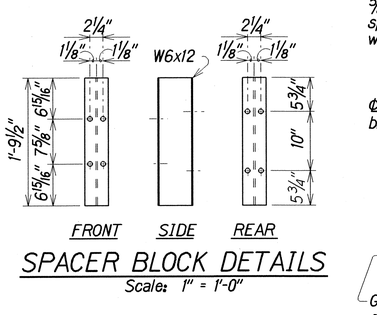
TRANSITION SECTION

Scale: 1" = 1'-0"



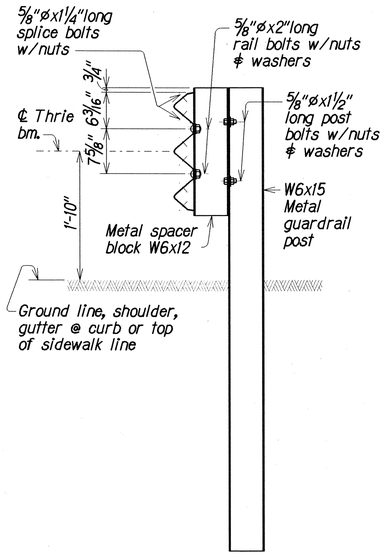
SECTION THRU RAIL ELEMENT

Scale: 1½" = 1'-0"



SPACER BLOCK DETAILS

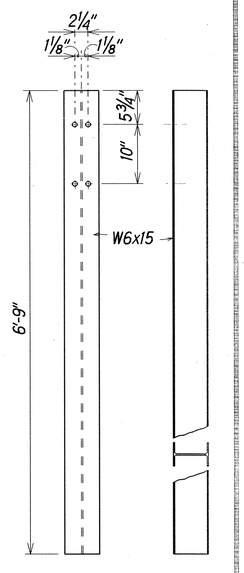
Scale: 1" = 1'-0"



TYPICAL SECTION

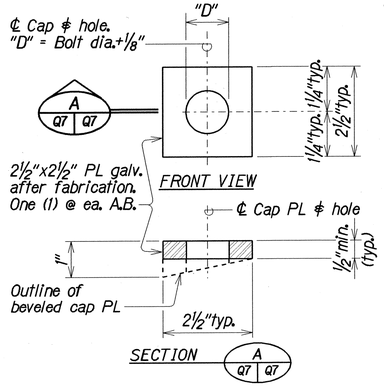
METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

Scale: 1" = 1'-0"



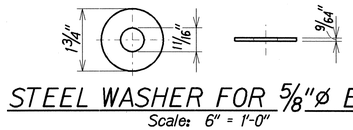
POST DETAILS

Scale: 1" = 1'-0"



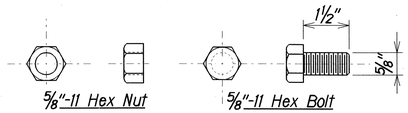
CAP (BEARING) PLATE DETAIL

Scale: 6" = 1'-0"



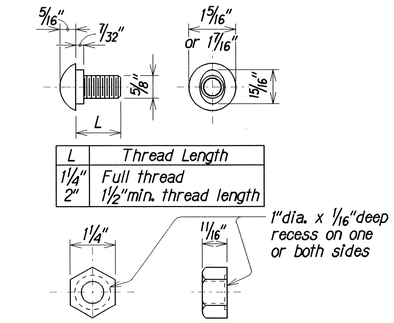
STEEL WASHER FOR ⅝"ø BOLT

Scale: 6" = 1'-0"



⅝"ø HEX BOLT ℄ NUT

Scale: 6" = 1'-0"



⅝"ø BUTTON HEAD BOLT ℄ RECESS NUT

Scale: 6" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	KMH	DATE	JUL 2001
	DRAWN BY			
	TRACED BY	DKY		JUL 2001
NOT BOLT QUANTITIES	DESIGNED BY	DKY		JUL 2001
	QUANTITIES BY	DKY		JUL 2001
	CHECKED BY	PS		JUL 2001
No.				

METAL GUARDRAIL TYPE 3 THRIE BEAM AND APPURTENANCES DETAILS

DATE	REVISION
12/10/01	Plan Sheet No. ADD.29 shall supercede Plan Sheet No. 29 per Addendum No. 1.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEAKEAKANI BRIDGE
METAL GUARDRAIL TYPE 3 THRIE BEAM AND APPURTENANCES DETAILS
QUEEN KAAHUMANU HIGHWAY
Guardrail & Shoulder Improvement, Kawaihae to Hapuna
Project No. NH-019-1(28)

Scale: As Noted Date: Jul. 2001

SHEET No. Q7 OF 7 SHEETS

ADD.29