FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	58	93

STRUCTURAL GENERAL NOTES:

1. General:
   A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specification, 4th Edition, 2007 including its subsequent interim specifications, and the Hawaii Standard Specifications for Bridge and Road Construction, 2005 as modified by the State of Hawaii Department of Transportation.
   B. The Contractor shall compare the Civil, Electrical and Structural drawings with each other and report in writing to the Engineer, inconsistencies or omissions.
   C. The Contractor shall take field measurements and verify field conditions and shall compare such field measurements and conditions with the drawings before commencing the work. Report in writing to the Engineer all inconsistencies or omissions.
   D. The Contractor shall be responsible for methods of construction, workmanship and job safety. The Contractor shall provide temporary shoring and bracing as required for stability of structural members and systems.
   E. Details noted as typical on structural drawings shall apply in all conditions unless specifically shown or noted otherwise.
   F. The Contractor shall be responsible for coordinating the work of all trades.
   G. The Contractor shall be responsible for protection of the adjacent properties, structures, streets, and utilities during the construction period. Any damage or deteriorated property shall be restored to the same or better condition at no cost to the State.

2. Design Criteria:
   A. Dead Load
      Weight of all components of the structures, appurtenances attached thereto, and earth covers.
      Future wearing surface (curb to curb)_____25 psf
      Future utilities on each side of the bridge_____150 plf
   B. Live Load
      AASHTO HL-93 Loading
   C. Seismic
      Seismic design is in accordance with the AASHTO Guide Specifications for LRFD Seismic Bridge Design, 1st Edition, 2009, as modified by the State of Hawaii Department of Transportation.
      0.2-second spectral response acceleration coefficient, Ss = 0.50
      1.0-second spectral response acceleration coefficient, S_1 = 0.14
      Horizontal peak ground acceleration coefficient, PGA = 0.25
      Site class _____ = E
      Seismic design catagory, SDC _____ = C
   D. Basic Wind Speed _____ = 105 MPH
   E. Bridge Railing _____in accordance with AASHTO TL-2 design factors
   F. Static Lateral Earth Pressure
      Active condition, above groundwater _____ = 40 pcf
      Active condition, below groundwater _____ = 80 pcf
      At-Rest condition, above groundwater _____ = 58 pcf
      At-Rest condition, below groundwater _____ = 88 pcf

3. Foundation:
   A. Foundation design is based upon geotechnical investigations by Geolabs Inc. and dated July 30, 2010.
   B. Contractor shall provide for de-watering of excavation from either surface water, ground water or seepage. NPDES permit required for discharging into State waters.
   C. Contractor shall provide for design and installation of all cribbing, sheeting, and shoring necessary for personnel safety and to preserve excavations and earth banks, and adjacent structures and property for damage.
   D. Excavation boundaries and grade elevations for footing shall be approved by the Engineer prior to placing the concrete and reinforcing.
   E. Backfill behind the retaining structures (above the groundwater level) may consist of the on-site soils or select granular fills (Type A Structure Backfill). Backfill shall be placed in uniform lifts of no more than 8 inches in loose thickness and uniformly compacted to at least 95 percent relative compaction. Because shallow groundwater conditions are anticipated, backfill materials below the groundwater level should consist of free-draining granular materials, such as AASHTO M43, No 67 gradation (ASTM C33, No 67 gradation), wrapped on all sides with non-woven filter fabric (Mirafi 180N or equivalent). The free-draining granular materials should be used up to a level of about 12 inches above the groundwater level to facilitate compaction of the backfill materials.
   F. The locations of the proof test piles, as shown on Sheet S1.4 are subject to change based upon construction observations of the micropile installation.

4. Concrete:
   A. Concrete shall be regular weight hard rock concrete and shall have the following minimum 28-day compressive strengths:
      a. Prestressed planks _____7000 psi
      b. Slab topping, beams, abutment walls, and wing walls _____4000 psi
      c. Abutment footings _____4000 psi
      d. Traffic railing and end posts _____4000 psi
      e. Approach slabs _____4000 psi
      f. All other concrete _____Class "A"
      All concrete shall have maximum w/c ratio of 0.45 except for Class "A" which shall be as specified in the standard specifications.
   B. Tetraguard AS20 shrinkage reducing admixture, Eclipse Plus shrinkage reducing admixture, or an approved equal, shall be included in the concrete mix for the concrete topping and bridge railing. The required dosage shall be 128 ounces per cubic yard of concrete or as recommended by the manufacturer. Addition of shrinkage reducing admixture shall be as recommended by the manufacturer.
   C. A corrosion inhibiting admixture shall be included in the concrete mix for all concrete. The corrosion inhibiting admixture shall contain a minimum of 30% calcium nitrate by mass and shall be added at a dosage rate of 4.0 gallons per cubic yard of concrete or as recommended by the manufacturer. The admixture shall be Rheocrete CNI Calcium Nitrate-Based corrosion inhibitor, DCI S corrosion inhibitor or an approved equal. Addition of corrosion inhibiting admixture shall be as recommended by the manufacturer.
   D. All inserts, anchor bolts, plates, etc. embedded in concrete shall be hot-dip galvanized unless otherwise noted.
   E. Conduits, pipes, and sleeves passing through a wall not conforming to typical details shall be located and submitted to the Engineer for approval.
   F. Construction joints may be relocated by the Contractor and submitted to the Engineer for approval. Construction joints shall be made and relocated as not to impair the strength of the structure and to minimize shrinkage stresses. All construction joints shall be cleaned, laitance removed and wetted. See typical details for specific requirements.
   G. Unless otherwise noted, chamfer all concrete edges 3/4".
   H. Concrete delivery tickets shall record all free water in the mix: at batching by plant, for consistency by driver, and any additional request by Contractor if permitted by the mix design.
   I. Reinforcing bars, anchor bolts, inserts and other items to be cast in the concrete shall be secured in position prior to placement of concrete.
   J. Non-shrink Grout Shall Conform to Section 712.04 of the Standard Specification.

5. Reinforcing Steel:
   A. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60 Unless Otherwise Noted.
   B. Pre-stress strands shall be uncoated seven wire low-relaxation strand conforming to ASTM A416 Grade 270, or AASHTO M203 Grade 270.
   C. Clear concrete coverage for reinforcing bars shall be as follows, unless otherwise noted:
      a. Footing, Grade Beams, ETC.
         Cast against earth _____3"
      b. Footing, Grade Beams, ETC.
         Formed and exposed to earth _____2"
      c. Wall faces exposed to earth or weather _____2"
      d. Deck slabs
         i. Top bars _____2 1/2"
         ii. Bottom bars_____1 1/2"
   D. Stainless steel reinforcing bars shall be Type 316 grade conforming to ASTM A955 grade 60.
   E. Fiber Reinforced plastic (FRP) rebars shall have a minimum ultimate tensile strength of 115 ksi, and a modulus of elasticity of 6.5x10 psi. Use glass fibers and vinyl ester binder. Field cutting of FRP rebars shall be with a high speed grinder cutter or saw. Do not shear bars.
   F. Thru bolts for guardrail connection shall conform to AASHTO M164 (ASTM A325), unless otherwise noted.
   G. Splices:
      a. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule, Sht S0.3, unless otherwise noted.
   H. Bar bends and hook shall be "standard hooks" in accordance with Typical Details Sht S0.3.

6. Structural Steel:
   A. Fabrication and erection of structural steel shall conform to the AASHTO LRFD Bridge Construction Specifications, Third Edition, including its subsequent interim specifications.
   B. Structural steel shall conform to ASTM A36, unless otherwise noted.
      a. Steel wide flange sections shall conform to ASTM A992.
      b. Steel pipes shall conform to ASTM A53, Grade B.
      c. Steel tubes shall conform to ASTM A500, Grade B.
      d. Bolts shall conform to ASTM A307, Grade A, unless otherwise noted.
      e. Welds and welding procedures shall conform to the structural welding code AWS D1.1 of the American Welding Society.
      f. Welding shall be performed by welders that are prequalified for applicable welding procedures.
      g. The Contractor shall hire an independent special inspector to conduct ultrasonic NDT testing of all field welds. The cost for all testing shall be paid for by the contractor under various contract pay items. The inspection test results shall be provided to the DOT.
      h. Welding electrodes shall be E70XX.
      i. All steel shall be hot-dip galvanized after fabrication.

7. Metal Pedestrian Railing:
   A. The metal pedestrian railings shall be hot dip galvanized after fabrication and shop painted according to Paint Schedule, Sht. S0.2.
   B. The metal railing posts shall be field welded to embedded plate in the top of concrete railing as shown on Sht. S4.1.
      a. After welding is complete, remove all weld slag, splatter, damaged galvanizing material, and all other welding by-products from the surface of the railing posts and embedded plates.
      b. Prepare surface of steel per SSPC-SP1.
      c. Rust scale shall be cleaned per SSPC-SP3.
      d. Apply (2) coats of cold applied, galvanizing compound containing 95% metallic zinc content by weight in dry film and 52% solids content by volume.
      e. The coating shall be well stirred before use so that it is completely homogeneous during application.
      f. Minimum dry film build is 3 mils, using manufacturer's recoat time directions.
      g. The coating shall be applied at sufficient wet film thickness to achieve a minimum dry film.
      h. Apply paint system according to paint schedule Sht. S0.2.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S0.1 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	59	93

Painting Notes:

1. Contractor shall shop coat all members. Field coating shall consist of touch up only.
2. The touch up paint shall consist of the following:
   a. prepare surface per SSPC-SP1, solvent cleaning.
   b. apply first and second coat according to paint schedule
3. Color for top coat shall be an earthtone light brown or green, as proposed by the contractor and approved by the Engineer. Intermediate coat shall have contrasting light color. Finish for top coat shall not be gloss or high gloss.
4. Multiple coats may be required to obtain minimum dry film thickness (DFT).
5. All hot-dip galvanized coating that is damaged shall be repaired. The repairs shall consist of the following:
   a. Prepare surface per SSPC-SP1, solvent cleaning.
   b. Apply (2) coats of cold applied, galvanizing compound containing 95% metallic zinc content by weight in dry film and 52% solids content by volume.
   c. Application rate shall be 1.5 mils dry film thickness per coat.
   d. Rust scale shall be cleaned per SSPC-SP3.
   e. The coating shall be applied at sufficient wet film thickness to achieve a minimum dry film.
   f. The coating shall be well stirred before use so that it is completely homogeneous during application.
   g. Minimum dry film build is 3 mils, using manufacturer's recoat time directions.
   h. Apply paint system according to paint schedule.
6. Painting of galvanized steel shall be in accordance with ASTM D6386, "Standard Practice for Preparation of Zinc (Hot-Dipped Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting."
7. Cost of painting is incidental to metal railings.

ABBREVIATIONS

℄	Baseline	Galv	Galvanized
Bot	Bottom	Horiz	Horizontal
Btwn	Between	HSB	High Strength Bolt
℄	Centerline	I.D.	Inside Diameter
CJ	Construction Joint	Max	Maximum
Clr	Clear	Mech	Mechanical
Conc	Concrete	Min	Minimum
Cont	Continuous	Misc	Miscellaneous
Dbl	Double	No. or #	Number
Dia	Diameter	N.T.S.	Not to Scale
Dwg	Drawing	O.C.	On center
Ea	Each	O.D.	Outside Diameter
E.F.	Each Face	Opng	Opening
Elev	Elevation	Opp	Opposite
Eq	Equal	PL or ℙ	Plate
E.W.	Each Way	Prefab	Prefabricated
Exist or (E)	Existing	Ref	Reference
Ext	Exterior	Reinf	Reinforced or Reinforcing
Fin	Finish	Sim	Similar
Ft	Foot or Feet	Sp	Spaces or Spacing
Ftg	Footing	ss	Stainless Steel

PAINT SCHEDULE

SPECIAL COATING SCHEDULE FOR ZINC COATED METAL BRIDGE RAILING

	OPTION 1	OPTION 2	OPTION 3	OPTION 4
PREPARATION:	Carboline thinner #2 or surface cleaner #3, per SSPC-SP1, Apply Rustbond Penetrating Sealer.	Solvent clean per SSPC-1, and as recommended by the manufacturer	Solvent clean per SSPC-SP1, and as recommended by the manufacturer	Solvent clean per SSPC- SP1. Apply Galvanized Zinc Treatment (Acid Etching)
1ST COAT:	Carboline Carboguard 890 epoxy DFT 5 mil (min) WFT 7 mil (min)	Tnemec High-Build Epoxoline II Series N69 DFT 5 mil (min) WFT 7 mil (min)	Sherwin Williams Tile Clad High Solids B62 Series DFT 4 mil (min) WFT 7 mil (min)	Ameron Amercoat 385 epoxy DFT 5 mil (min) WFT 8 mil (min)
RECOATING TIME:	8 HRS (min) 2 Days (max)	10 HRS (min) 2 Days (max)	8 HRS (min) 14 Days (max)	8 HRS (min) 2 Days (max)
TOP COAT:	Carboline Carbothane 133HB Alyphatic polyurethane DFT 5 mil (min) WFT 7 mil (max)	Tnemec Endura-Shield Series 75 DFT 4 mil (min) WFT 7 mil (min)	Sherwin Williams Corothane II B65 W200 Series/B60V2 DFT 4 mil (min) WFT 7 mil (min)	Ameron Amercoat 450 SA Polyurethane DFT 4 mil WFT 7 mil
TOP COAT COLOR:	Medium Shade Green, submit color chips for approval.			

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HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S0.2 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	60	93

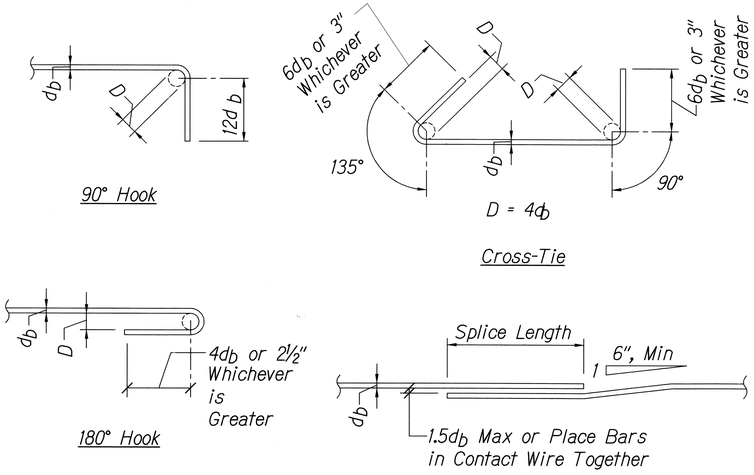
MINIMUM SPLICE & EMBEDMENT LENGTHS

BAR SIZE	CONCRETE STRENGTH = 4,000 PSI				
	LAP SPLICE		EMBEDMENT		
			STRAIGHT		WITH STANDARD 90° HOOK
	OTHER BARS	TOP BAR	OTHER BARS	TOP BAR	
#3, #4	21"	29"	12"	17"	7"
#5	26"	36"	15"	21"	9"
#6	31"	43"	18"	26"	10"
#7	39"	54"	23"	32"	12"
#8	51"	71"	30"	42"	14"
#9	64"	90"	38"	53"	15"
#10	81"	114"	48"	67"	17"
#11	100"	140"	59"	82"	19"

Notes:
1. "Top Bars" are horizontal bars with 12" or more of concrete cast below.
2. Splice lengths may be reduced by multiplying the tabulated values by 0.765 if the centerline of splice of adjacent bars are staggered 6'-0" o.c. for #9 bar and smaller and 9'-0" o.c. for #10 bar and larger.
3. Embedment lengths for straight bars may be reduced by multiplying the tabulated values by 0.80 if the bars are spaced laterally not less than 6" center-to-center, with not less than 3" clear cover measured in the direction of the spacing.
4. Embedment lengths for bars with 90° hook are bars with side cover, normal to plane of hook, of not less than 2½" and cover on bar extension beyond hook not less than 2". Increase embedment length by 43% for bars not meeting these requirements.

TYPICAL REBAR SPLICE AND EMBEDMENT LENGTH SCHEDULE — 1 — S0.3 | S0.3

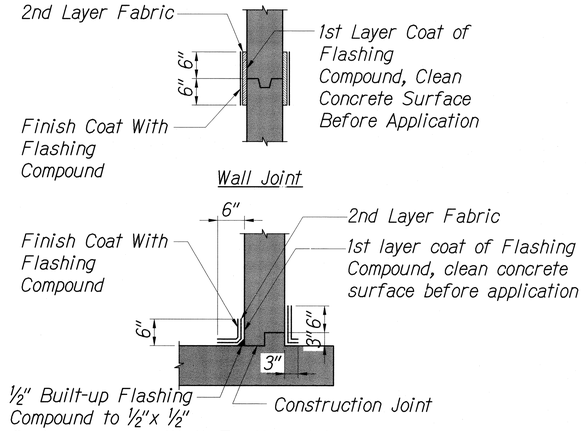
Not to Scale



D = $6d_b$ for #8 and Smaller
D = $8d_b$ for #9 to #11

STANDARD HOOKS AND CROSS-TIE DETAIL — 2 — S0.3 | S0.3

Not to Scale



Note: Typical each face unless noted otherwise

TYPICAL WATERPROOFING DETAIL — 3 — S0.3 | S0.3

Not to Scale

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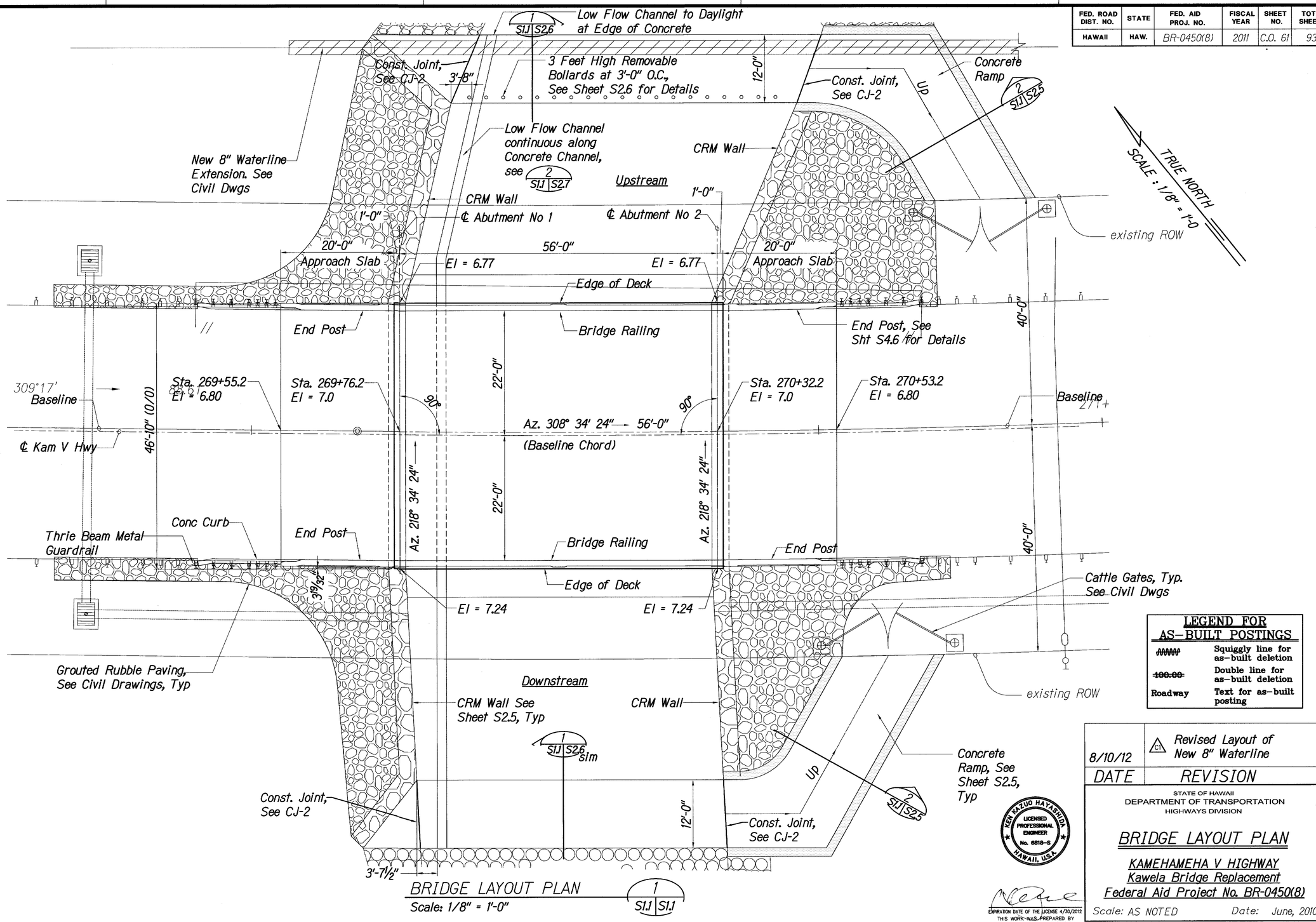
TYPICAL DETAILS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S0.3 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	C.O. 61	93



BRIDGE LAYOUT PLAN
Scale: 1/8" = 1'-0"
1 S1.1 S1.1

LEGEND FOR AS-BUILT POSTINGS	
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Roadway	Text for as-built posting

DATE	REVISION
8/10/12	C1 Revised Layout of New 8" Waterline

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE LAYOUT PLAN

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S1.1 OF 93 SHEETS

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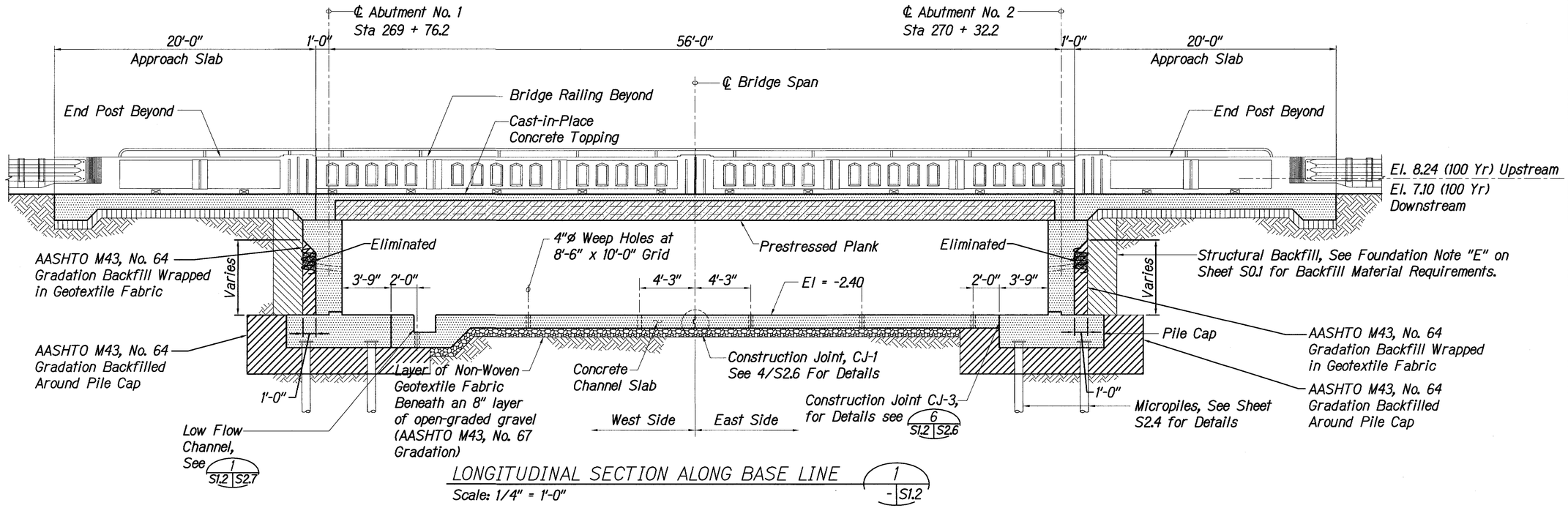
"AS-BUILT"

C.O. 61

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	62	93



LONGITUDINAL SECTION ALONG BASE LINE 1 / - | S1.2

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

Notes:

A. The sequence of construction is the responsibility of the contractor. The contractor shall conduct their construction activities such that the micropiles are not subjected to lateral loads, such as backfilling behind abutments, until after the channel slab beneath the bridge is in place and has sufficiently cured. The following construction sequence shall be followed to avoid imposing lateral loads on the micropiles during construction:
   1. Excavate for and construct abutments and channel slab according to Phasing Plan, Sheets C2.01 and C2.02.
   2. The abutments shall not be backfilled until after the channel slab is in place and has cured for at least 7 days.

B. Placement and repositioning of BMP's that will be used for channelizing stream flow during the various phases of the work shall be the responsibility of the contractor. Refer to BMP Notes, Sheets C2.01 and C2.02.

C. Channel slab subgrade shall be prepared by proof-rolling the soil subgrade to a firm condition.

LEGEND FOR AS-BUILT POSTINGS

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Roadway	Text for as-built posting

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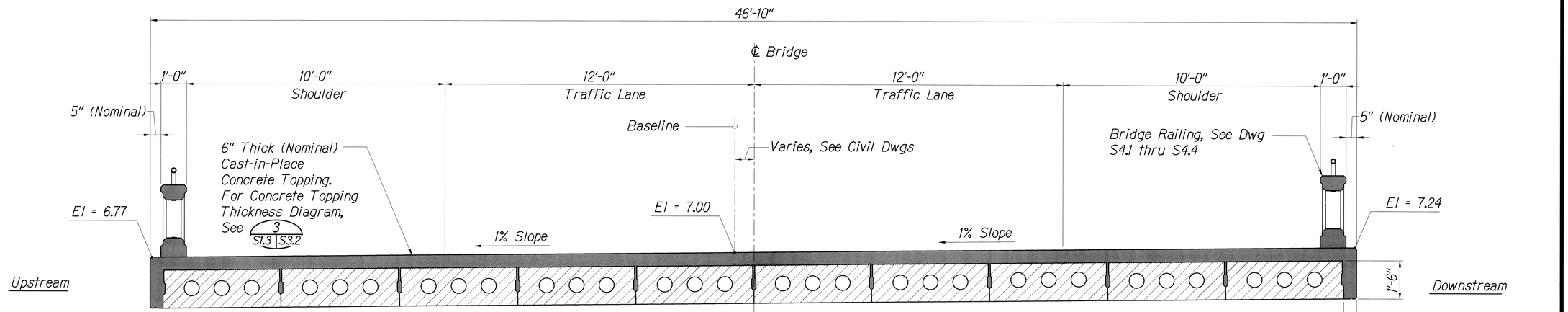
BRIDGE LONGITUDINAL SECTION
KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S1.2 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	63	93



TYPICAL BRIDGE CROSS-SECTION

1 / S1.3 | S1.3

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

Note:
Channel slab subgrade shall be prepared by proof-rolling the soil subgrade to a firm condition.

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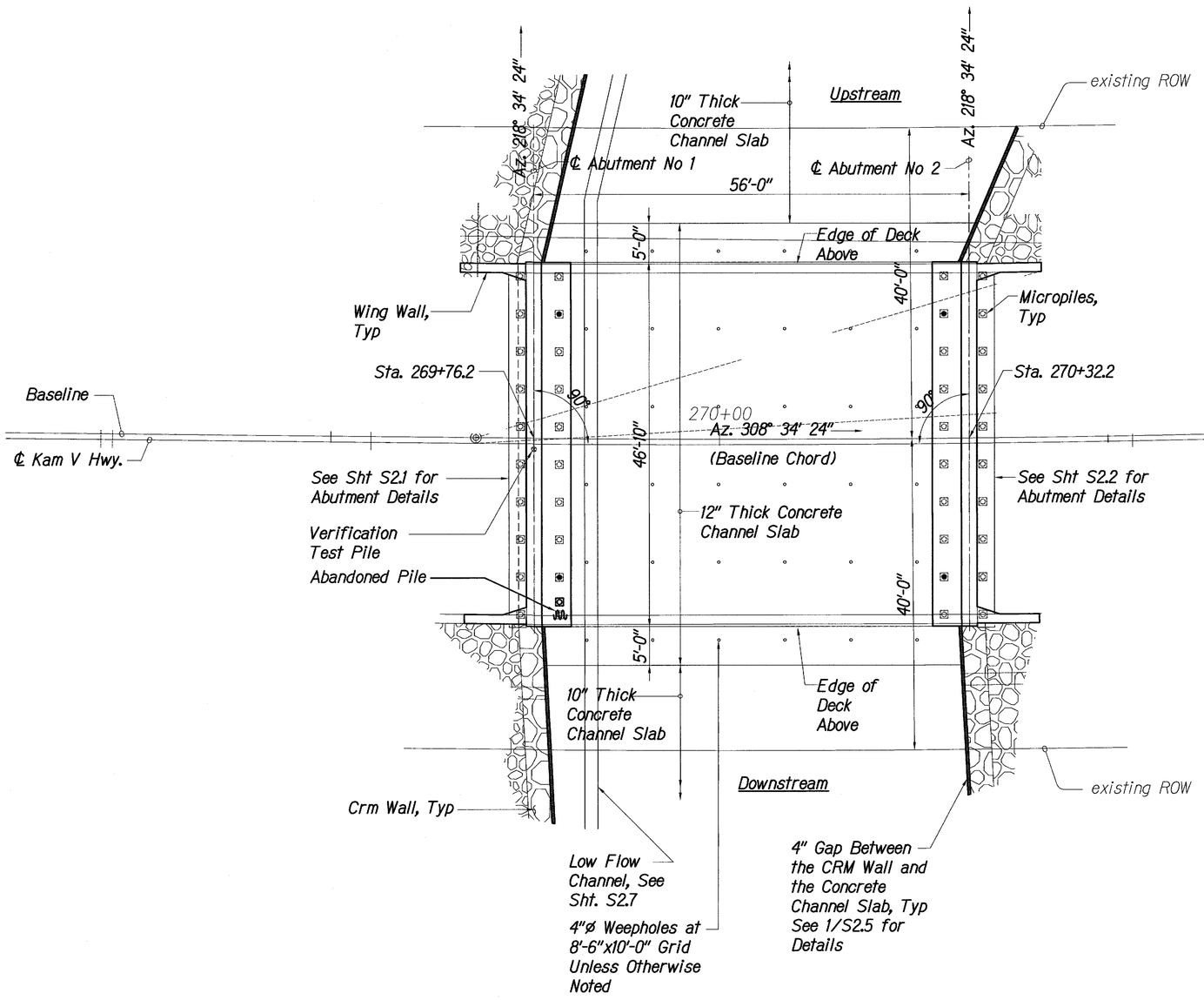
TYPICAL BRIDGE CROSS SECTION

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S1.3 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	64	93



TRUE NORTH
SCALE : 1/8" = 1'-0

FOUNDATION LAYOUT PLAN
Scale: 1/8" = 1'-0"

1
S1.4 | S1.4

Legend:

- Proof Test Piles, Qty. 4
- ⊛ Verification Test Pile, Qty. 1

Note:
Locations of proof test piles are subject to change based upon construction observations of the micropile installation.

LEGEND FOR AS-BUILT POSTINGS

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Roadway	Text for as-built posting

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FOUNDATION LAYOUT PLAN

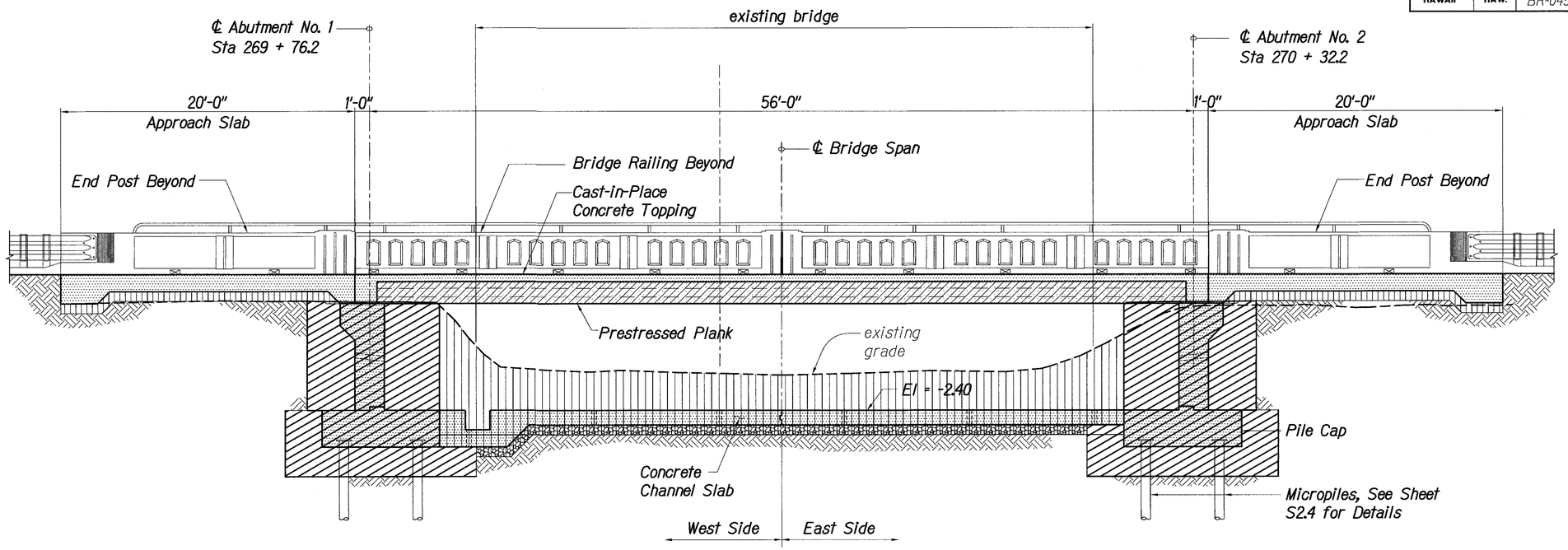
KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S1.4 OF 93 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	65	93



LONGITUDINAL SECTION ALONG BASE LINE (1 / S1.5 | S1.5)

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

Note:
Excavation for wingwall not shown and shall be considered incidental to excavation for abutment.

Legend:

Structure Excavation for Abutment

Structure Excavation for Channel

LEGEND FOR AS-BUILT POSTINGS	
~~WWWW~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

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HIGHWAYS DIVISION

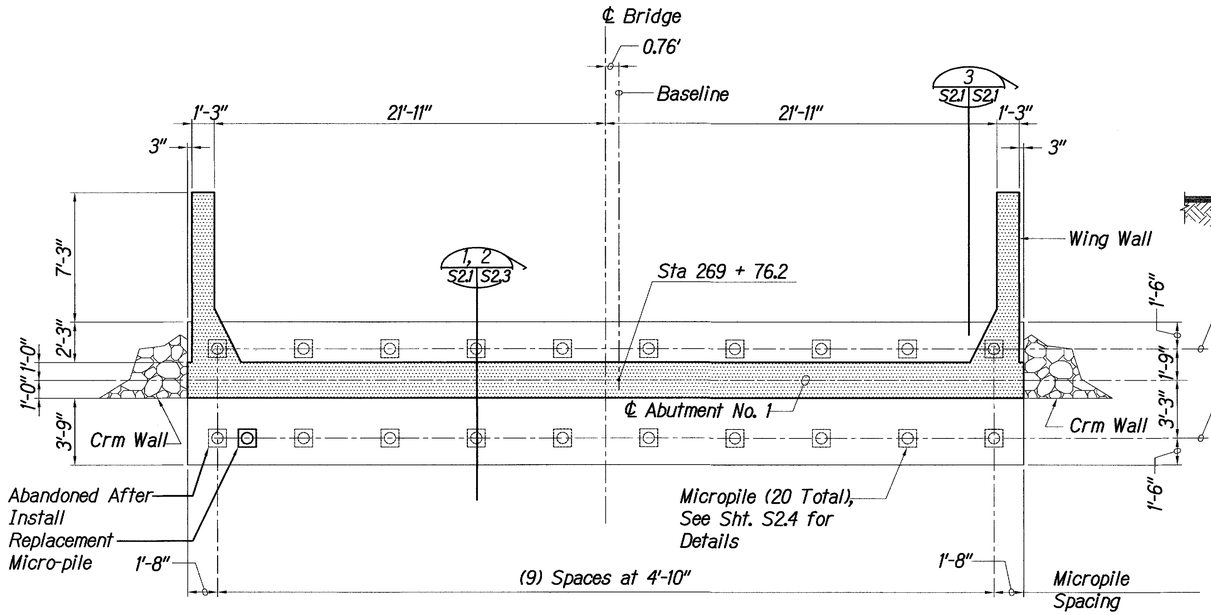
PAY LIMITS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

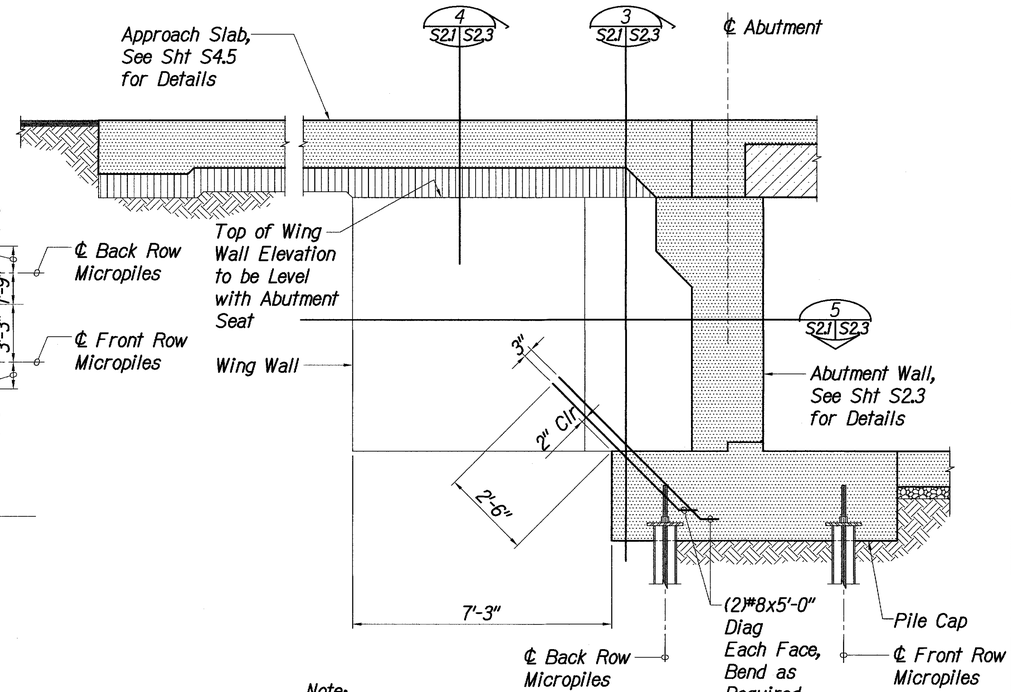
SHEET No. S1.5 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	ADD. 66	93



ABUTMENT NO. 1 - FOUNDATION PLAN — 1 S1.4 | S2.1

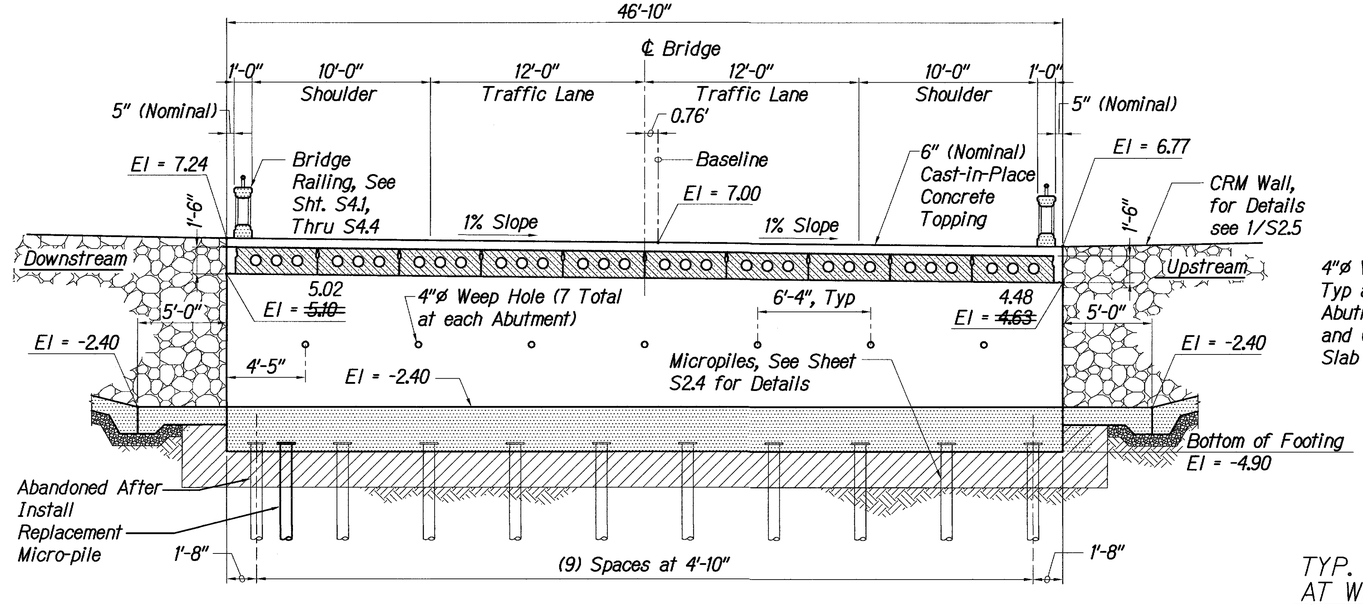
Scale: 1/4" = 1'-0"



Note:
End Post and Bridge Railings not shown.

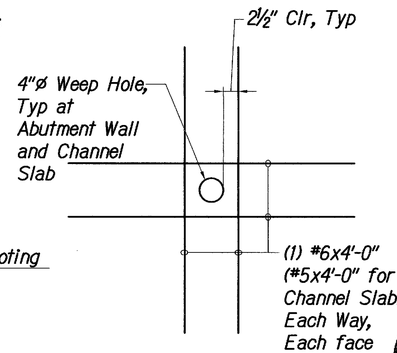
TYP WING WALL ELEVATION — 3 S2.1, S2.2 | S2.1

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



ABUTMENT NO. 1 - ELEVATION — 2 S1.4 | S2.1

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



TYP. ADDED REINFORCING AT WEEP HOLES — 4 S2.1, S2.2 | S2.1

Not to Scale

LEGEND FOR AS-BUILT POSTINGS

~~wwww~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

KEN KAZUO HAYASHIDA LICENSED PROFESSIONAL ENGINEER No. 6818-S HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO. 1 FOUNDATION PLAN AND ELEVATION

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

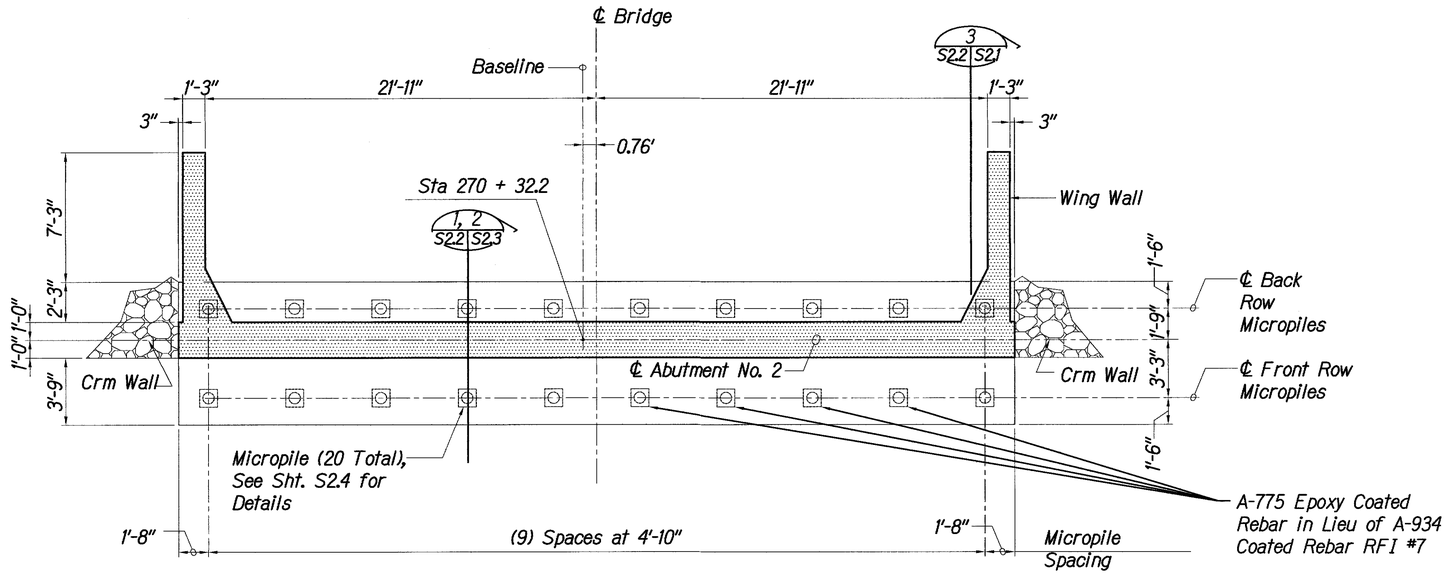
Scale: AS NOTED Date: June, 2010

SHEET No. S2.1 OF 93 SHEETS

"AS-BUILT"

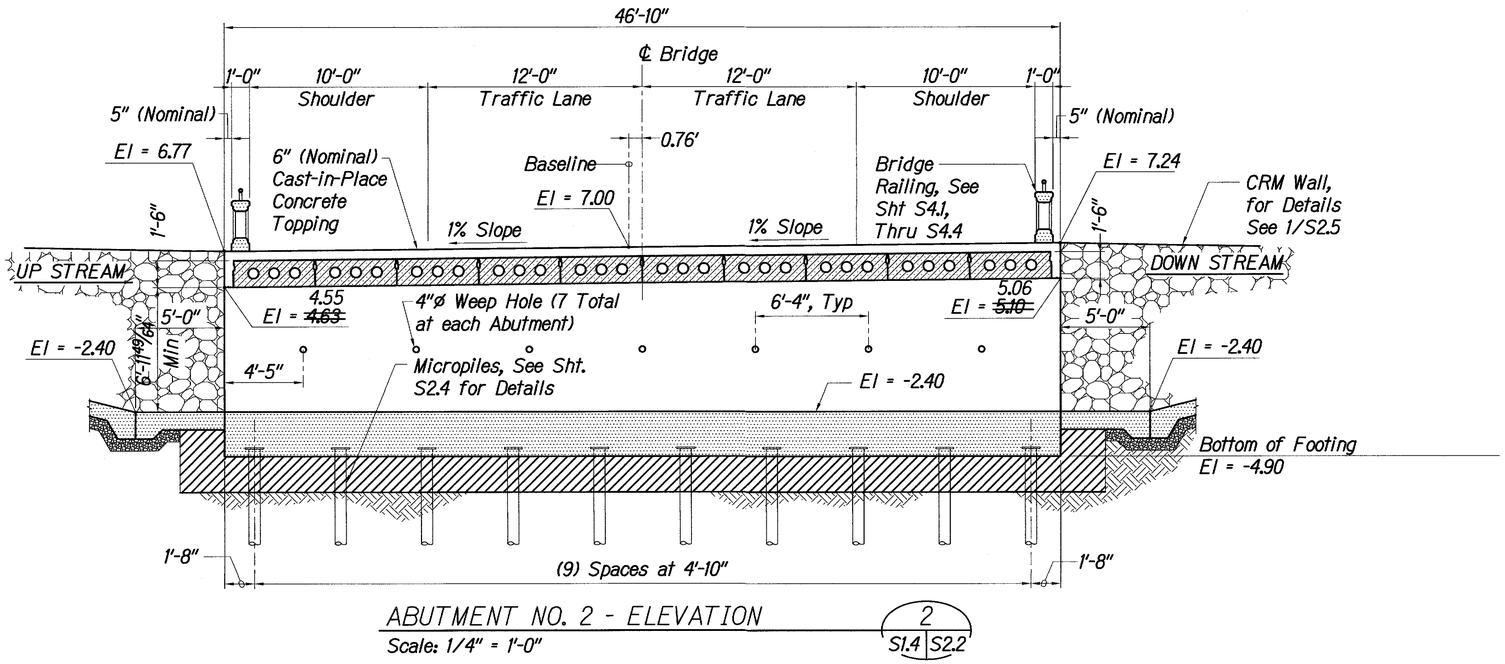
ADD. 66

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	ADD. 67	93



ABUTMENT NO. 2 - FOUNDATION PLAN — 1 / S1.4 | S2.2

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



ABUTMENT NO. 2 - ELEVATION — 2 / S1.4 | S2.2

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

LEGEND FOR AS-BUILT POSTINGS

~~AAAAA~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

Date	Revision
2 4/14/11	Revised length and width of wingwalls, and associated dimensions

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO. 2 FOUNDATION PLAN AND ELEVATION

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

KEN KAZUO HAYASHIDA — LICENSED PROFESSIONAL ENGINEER — No. 6816-S — HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

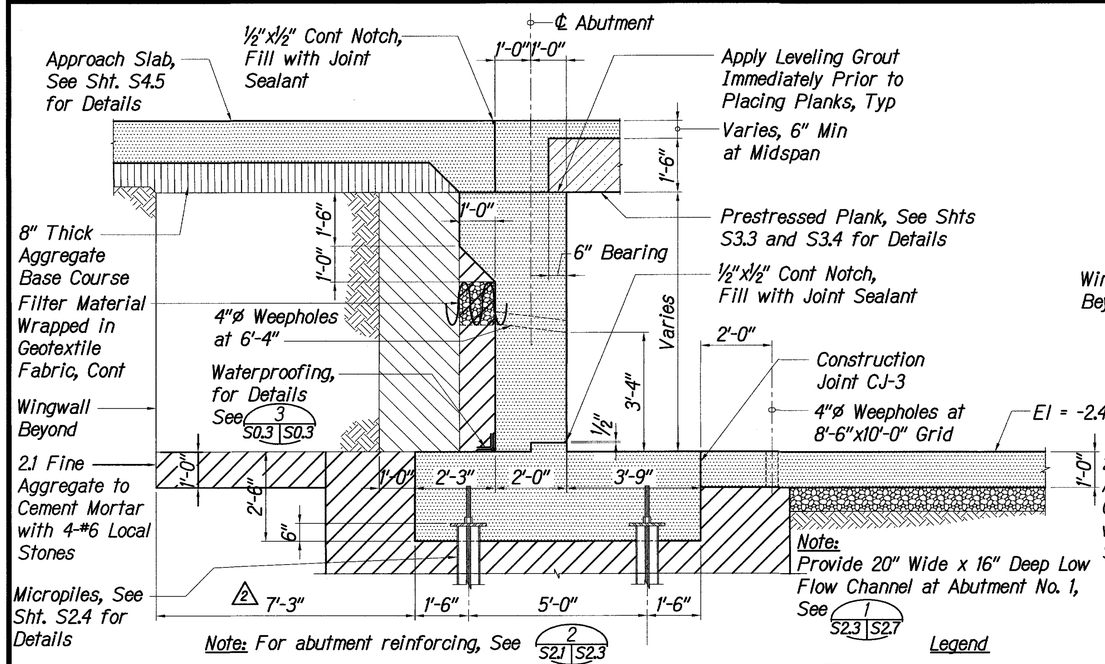
Scale: AS NOTED Date: June, 2010

SHEET No. S2.2 OF 93 SHEETS

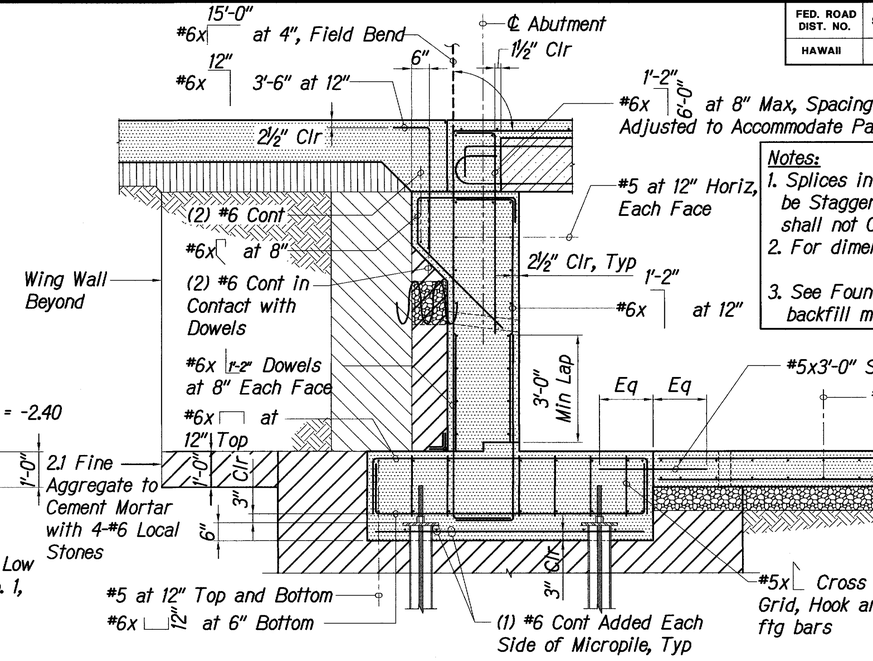
"AS-BUILT"

ADD. 67

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	ADD. 68	93

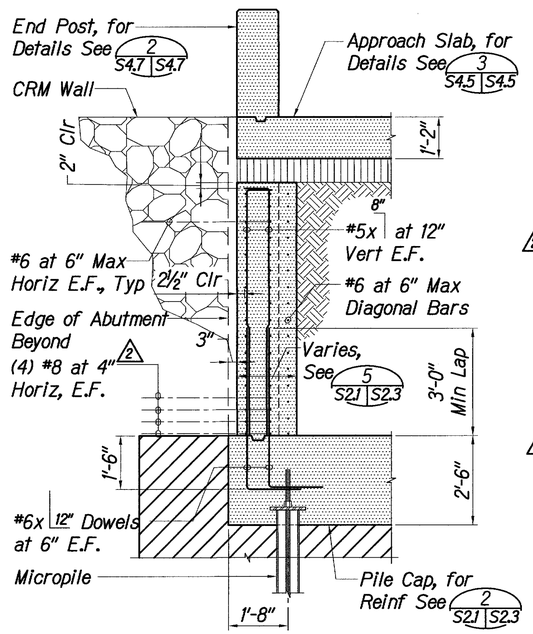


ABUTMENT SECTION SHOWING DIMENSIONS 1
Scale: 1/2" = 1'-0" S2.1, S2.2 S2.3

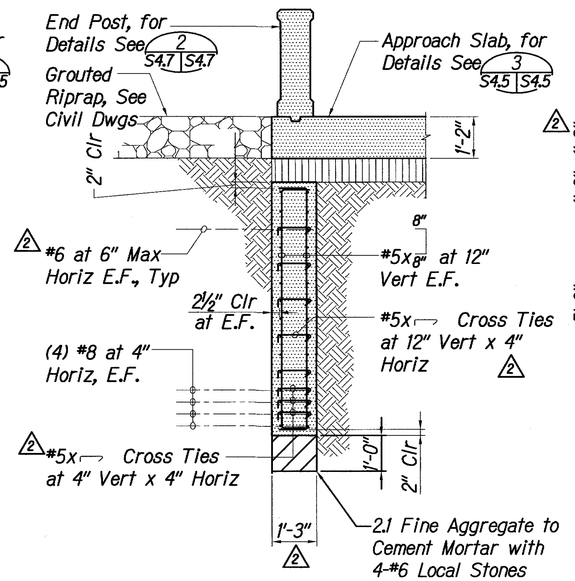


Notes:
1. Splices in the Abutment horiz reinf shall be Staggered and Splices in the two Layers shall not Occur at the same Location.
2. For dimensions, see 1 S2.1 S2.3
3. See Foundation note "E" on sht S0.1 for backfill material requirements.

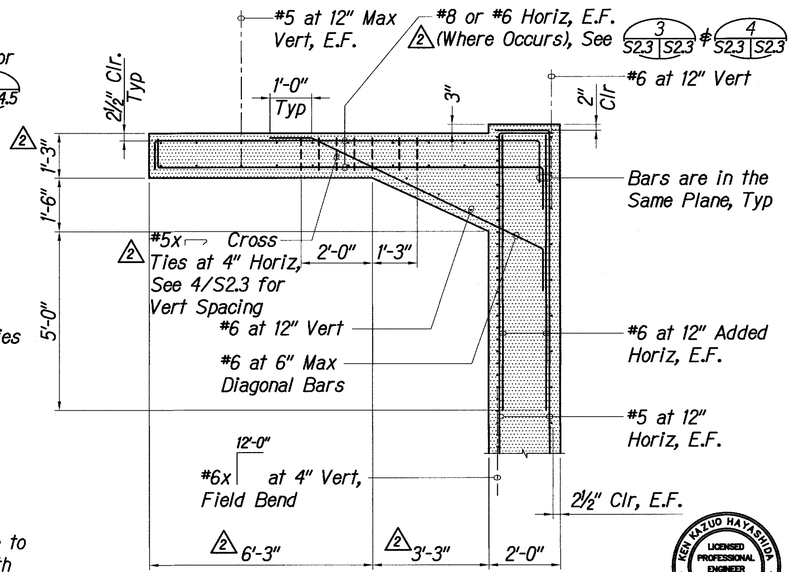
ABUTMENT SECTION SHOWING REINFORCMENT 2
Scale: 1/2" = 1'-0" S2.1, S2.2 S2.3



WING WALL SECTION 3
Scale: 1/2" = 1'-0" S2.1, S2.2 S2.3



SECTION 4
Scale: 1/2" = 1'-0" S2.1 S2.3



SECTION 5
Scale: 1/2" = 1'-0" S2.1, S2.2 S2.3

LEGEND FOR AS-BUILT POSTINGS

~~WWW~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

2 4/14/11	Revised length and width of wingwalls, and associated dimensions
Date	Revision

KEN KAZUO HAYASHIDA LICENSED PROFESSIONAL ENGINEER No. 6818-S HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT SECTIONS AND DETAILS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

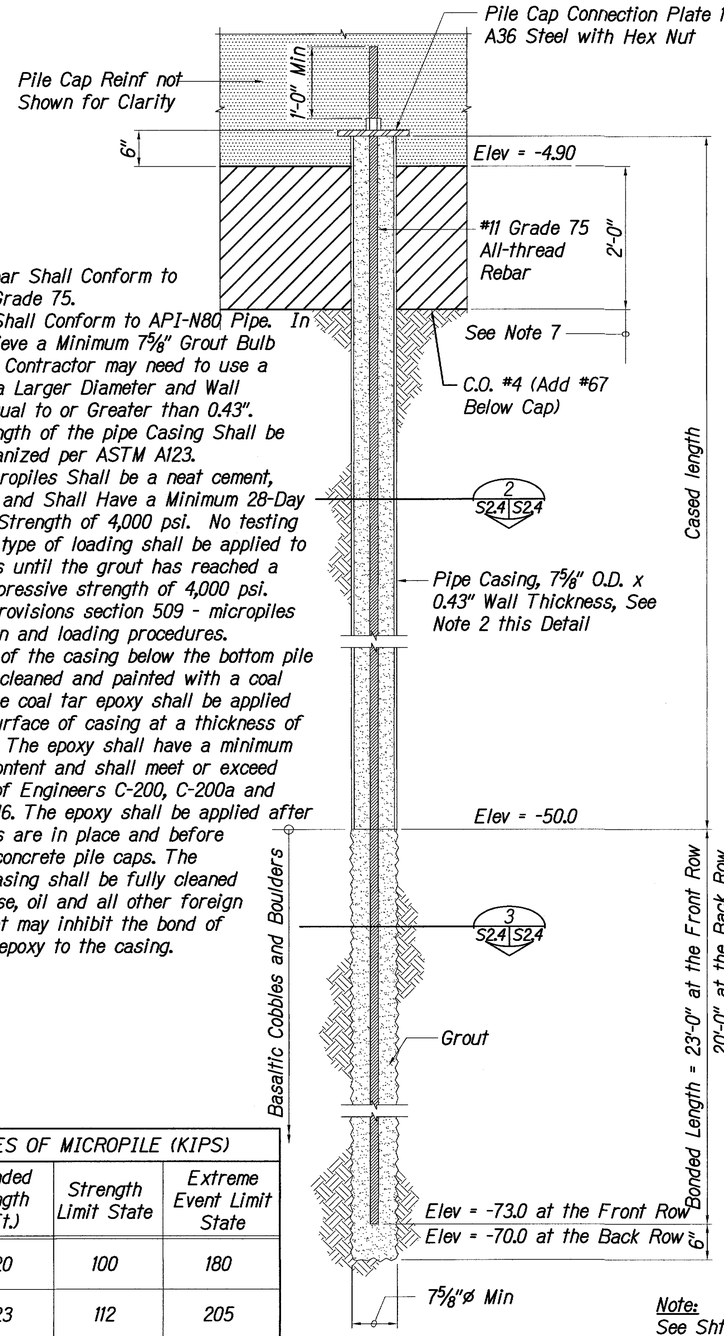
Scale: AS NOTED Date: June, 2010

SHEET No. S2.3 OF 93 SHEETS

"AS-BUILT"

ADD. 68

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	ADD. 69	93



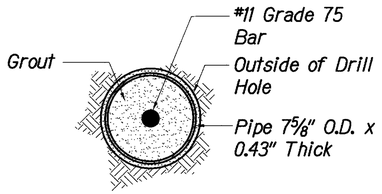
Notes:

1. All-thread Rebar Shall Conform to ASTM A615, Grade 75.
2. Pipe Casing Shall Conform to API-N80 Pipe. In order to Achieve a Minimum 7⅝" Grout Bulb diameter, the Contractor may need to use a Casing with a Larger Diameter and Wall Thickness Equal to or Greater than 0.43".
3. The entire length of the pipe Casing Shall be Hot Dip Galvanized per ASTM A123.
4. Grout for Micropiles Shall be a neat cement, Type I or II and Shall Have a Minimum 28-Day Compressive Strength of 4,000 psi. No testing or any other type of loading shall be applied to the micropiles until the grout has reached a minimum compressive strength of 4,000 psi.
5. See special provisions section 509 - micropiles for production and loading procedures.
6. The upper 2' of the casing below the bottom pile cap shall be cleaned and painted with a coal tar epoxy. The coal tar epoxy shall be applied on outside surface of casing at a thickness of 20 mils DFT. The epoxy shall have a minimum 74% solids content and shall meet or exceed Army Corps of Engineers C-200, C-200a and SSPC Paint 16. The epoxy shall be applied after the micropiles are in place and before pouring the concrete pile caps. The galvanized casing shall be fully cleaned of dirt, grease, oil and all other foreign materials that may inhibit the bond of the coal tar epoxy to the casing.

LOAD CAPACITIES OF MICROPILE (KIPS)			
	Bonded Length (Ft.)	Strength Limit State	Extreme Event Limit State
Compression	20	100	180
	23	112	205

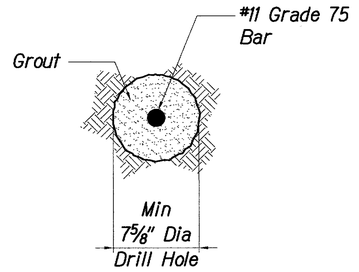
TYPICAL MICROPILE DETAIL — 1 (S2.4 | S2.4)
Not to Scale

Note:
See Sht. S2.1 and S2.2 for Micropile locations.



Note:
The annular space between the drill hole and the O.D. of the pipe casing shall be grouted throughout the cased length in order to provide lateral support of the micropile.

SECTION — 2 (S2.4 | S2.4)
Not to Scale



SECTION — 3 (S2.4 | S2.4)
Not to Scale

PILE DESIGN LOAD IN COMPRESSION (KIPS)		MAXIMUM PILE TEST LOAD (KIPS)	
Service Limit	Strength Limit	Verification Test = 2.0 x Strength Limit	Proof Test = 1.0 x Strength Limit
86	110	220	105 ~~#0~~

See RFI #3

Testing Notes:

1. One (1) Pile Verification Load Test shall be performed, this pile shall be sacrificial. Bonded length for this pile shall be 23'-0".
2. Four (4) Piles shall be Proof Tested, two on each Abutment.
3. See Sheet S1.4 for locations of Test Piles.

LEGEND FOR AS-BUILT POSTINGS

~~WWW~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

Date	Revision
2 4/14/11	Deleted Lateral Load Table and Previous Note 4.

KEN KAZUO HAYASHIDA — LICENSED PROFESSIONAL ENGINEER — No. 6818-S — HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL MICROPILE DETAILS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S2.4 OF 93 SHEETS

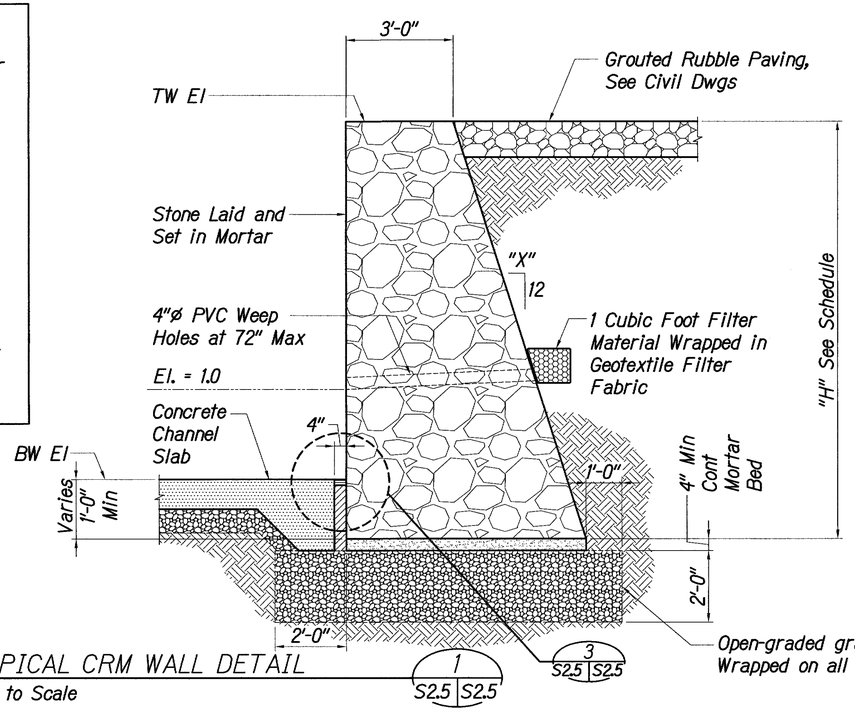
"AS-BUILT"

ADD. 69

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	70	93

Cement Rubble Masonry (CRM):

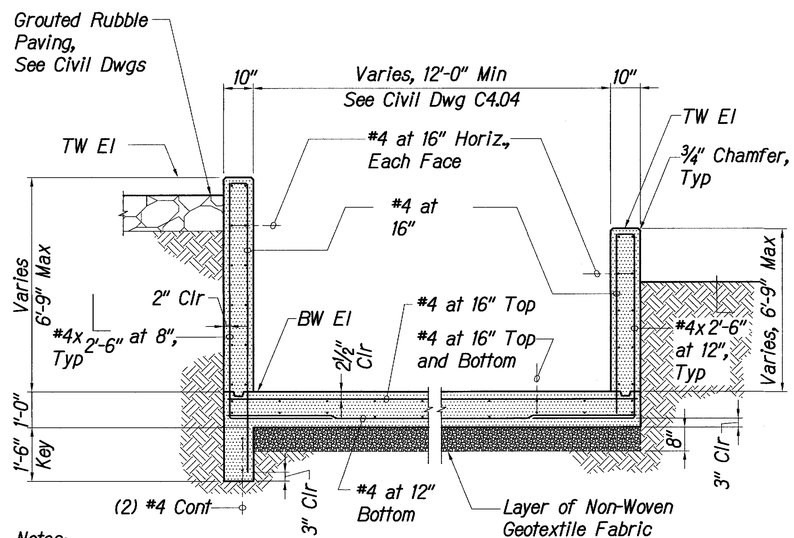
A. Stones shall be clean, hard, sound, and durable. Each stone, except stones for filling or pinning interstices, shall have a thickness of not less than 6 inches and a width of not less than one and one half times the thickness or 12 inches, whichever is greater.
B. Mortar shall be type "S" conforming to ASTM C270 and have a minimum compressive strength of 1,800 psi at 28 days.
C. Cement rubble masonry shall be constructed by experienced workmen.
D. Selected stones shall be roughly squared and pitched to lines at angles and ends of walls.
E. Stones shall be wet thoroughly before laying.
F. Stone joints shall overlap at least 6 inches and form a firm bond.
G. Stones for bottom course shall be large, flat and fully bedded in mortar.
H. Horizontal joints in the face of the wall shall not exceed 1 inch in thickness and vertical joints shall not exceed 2 inches in width.
I. CRM Wall subgrade shall be over-excavated by a minimum of 2 feet below the bottom of the wall and replace with open-graded gravel, such as AASHTO M43, No. 67 gradation wrapped on all sides with non-woven geotextile fabric.



TYPICAL CRM WALL DETAIL
Not to Scale

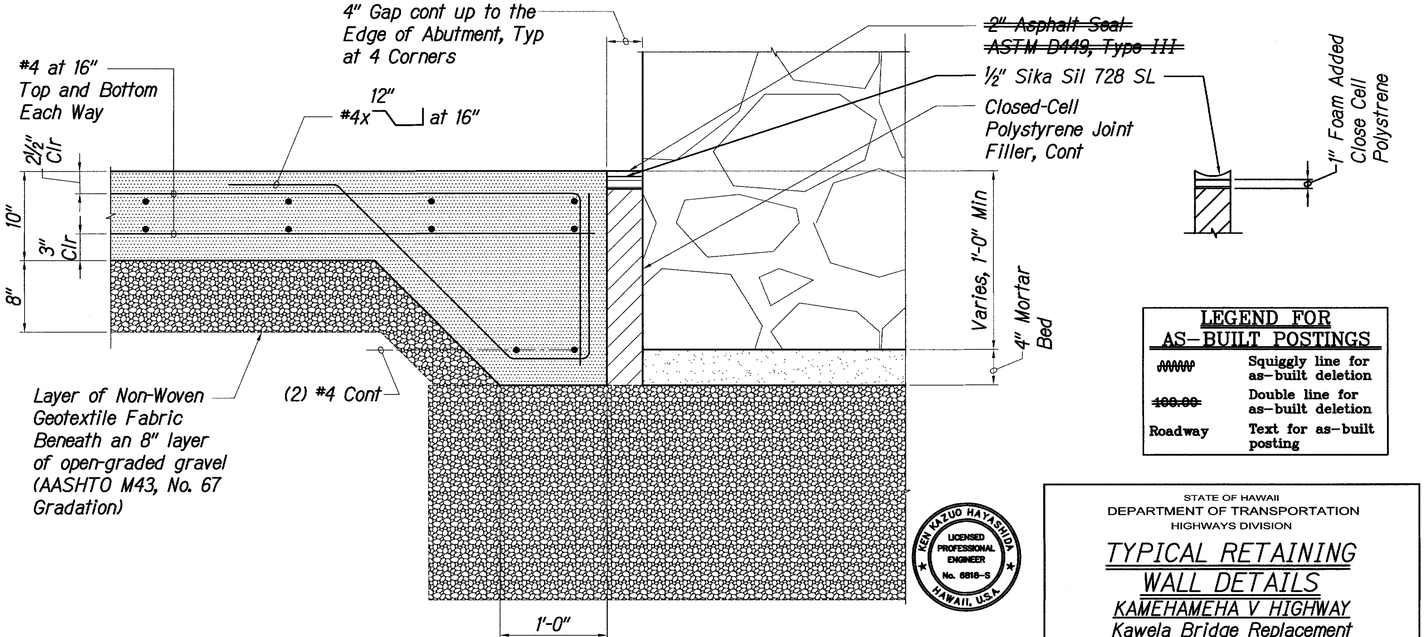
CRM Wall Schedule	
"H"	Batter on Back "X" : 12
≤ 10'-6"	8 : 12
≤ 8'-0"	7 : 12
≤ 6'-0"	6 : 12
≤ 4'-0"	4 : 12

Notes:
1. See Civil dwg sheet C4.06 for Top of Wall (TW) and Bottom of Wall (BW) elevations.
2. CRM wall base shall be flat or follow grade where grade is less than or equal to 2% slope. For grade larger than 2% slope, CRM wall base shall have step no more than 2'-0" in height.



Notes:
1. See Civil dwg sheet C4.06 for Top of Wall (TW) and Bottom of Wall (BW) elevations.
2. Eliminate footing key for wall height less than or equal to 3'-0".

TYPICAL ACCESS RAMP DETAIL
Not to Scale
2 S1.1 S2.5



CONCRETE SLAB - CRM WALL JOINT DETAIL
Scale: 1 1/2" = 1'-0"
3 S2.5 S2.5

LEGEND FOR AS-BUILT POSTINGS	
~~WWW~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL RETAINING WALL DETAILS

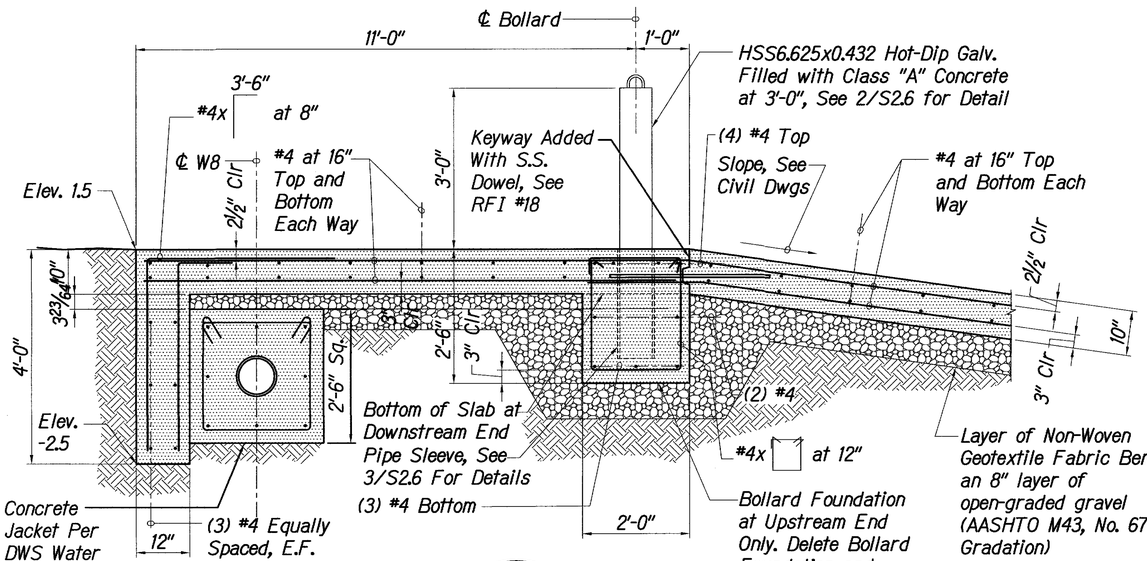
KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S2.5 OF 93 SHEETS

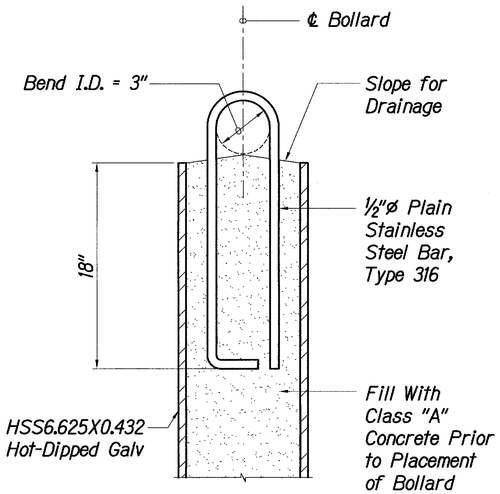
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	C.O. 71	93



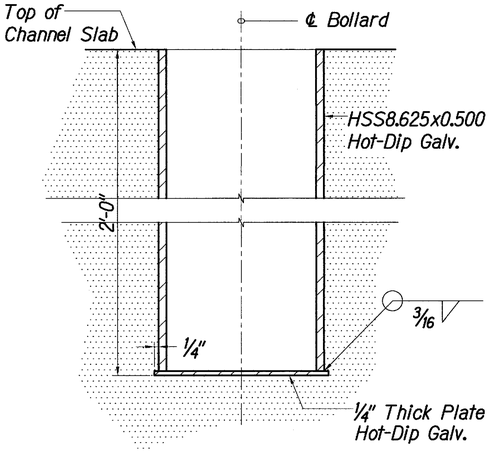
SECTION AT BOLLARD — 1 — S1.1 | S2.6

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



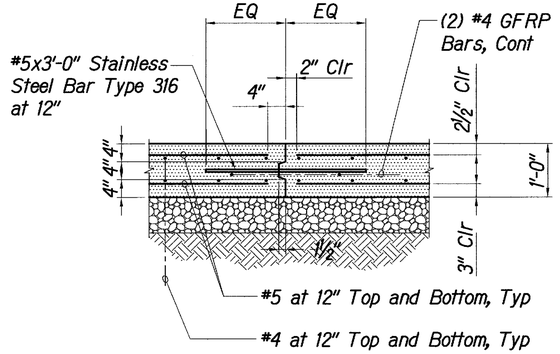
DETAIL — 2 — S2.6 | S2.6

Scale: 3" = 1'-0"



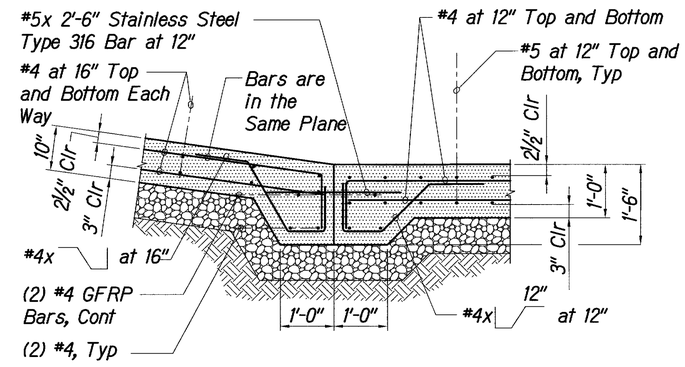
PIPE SLEEVE DETAIL — 3 — S2.6 | S2.6

Scale: 3" = 1'-0"



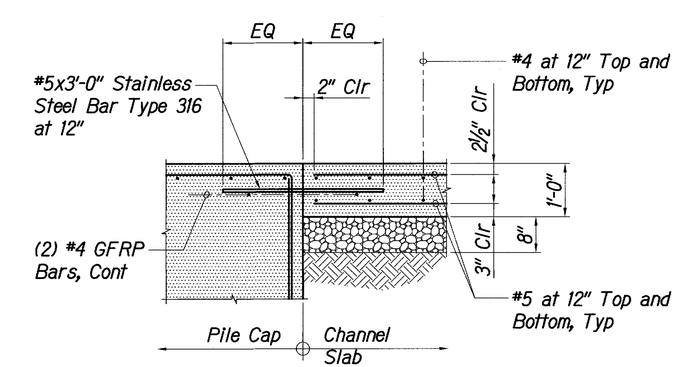
CONSTRUCTION JOINT DETAIL CJ-1 — 4 — S1.2 | S2.6

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



CONSTRUCTION JOINT DETAIL CJ-2 — 5 — S1.3 | S2.6

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



CONSTRUCTION JOINT DETAIL CJ-3 — 6 — S1.2 | S2.6

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

LEGEND FOR AS-BUILT POSTINGS

~~AAAAAA~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

Note:
The stainless steel rebar shall be supported only by GFRP rebar and not the carbon steel rebar. The stainless steel rebars shall never come in contact with carbon steel bars. Tie wires for connecting all stainless steel rebar shall be stainless steel wire or non-metallic wire.

KEN KAZUO HAYASHIDA — LICENSED PROFESSIONAL ENGINEER — No. 6818-S — HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE: 4/30/2012
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DATE	REVISION
8/10/12	C1 Added W8 Extension to Detail 1

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONCRETE CHANNEL SLAB AND BOLLARD DETAILS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

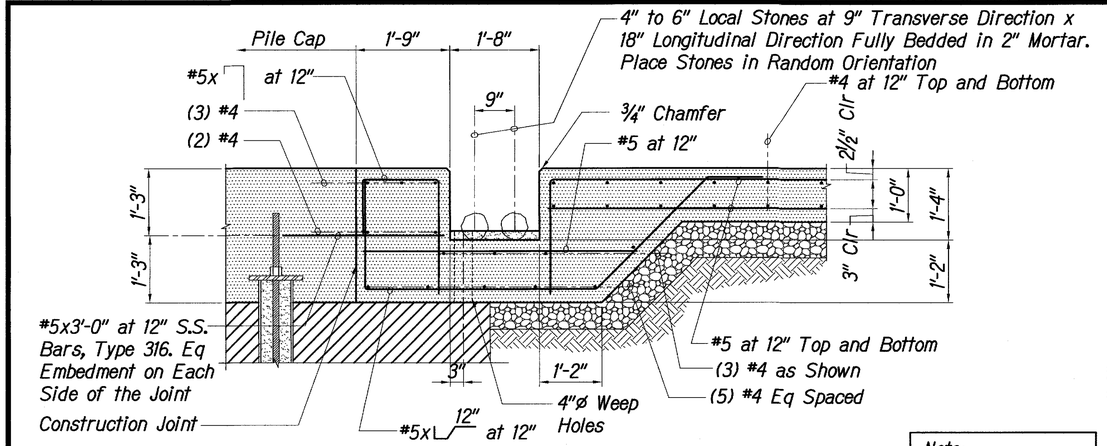
Scale: AS NOTED Date: June, 2010

SHEET No. S2.6 OF 93 SHEETS

"AS-BUILT"

C.O. 71

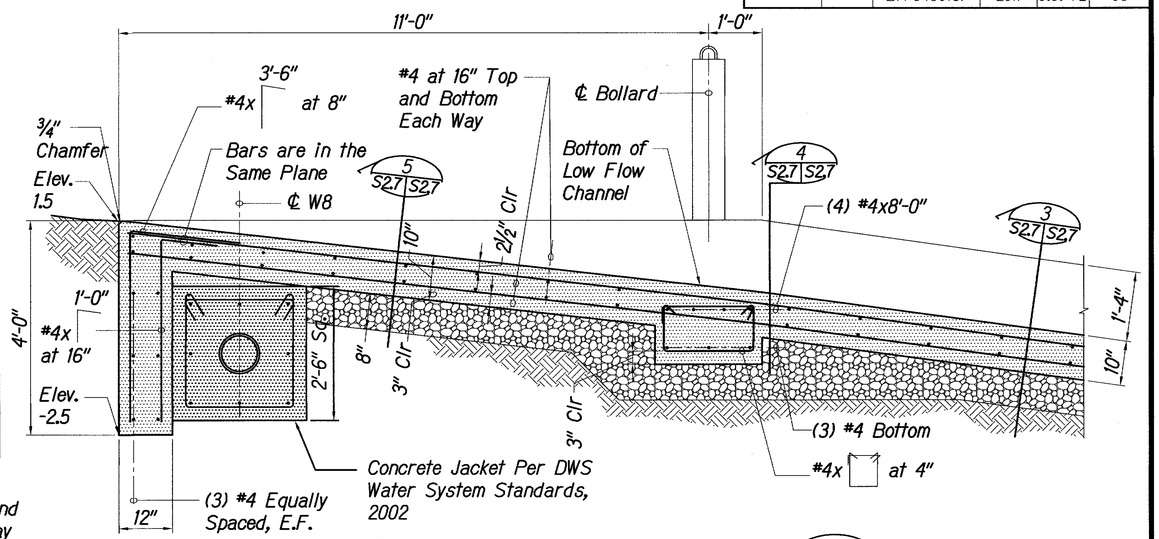
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	C.O. 72	93



LOW FLOW CHANNEL SECTION AT ABUTMENT NO. 1 — 1 — S1.2 | S2.7

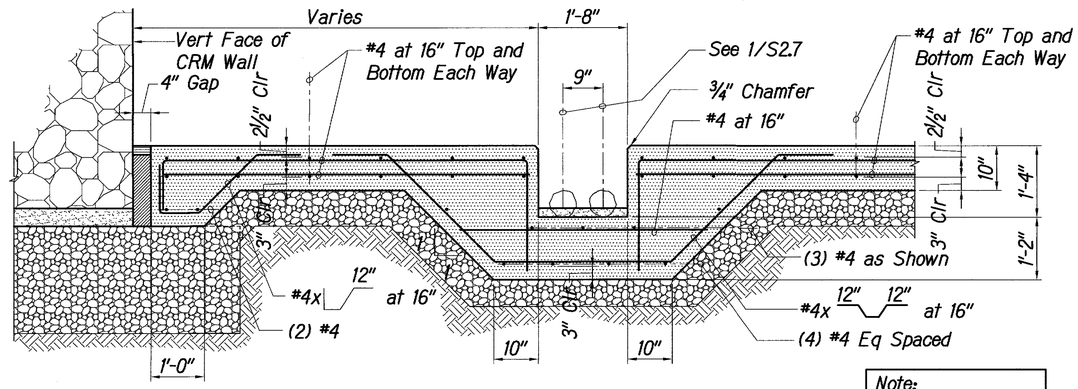
Scale: 3/4" = 1'-0"

Note:
Pile cap reinf not shown for clarity



LONGITUDINAL SECTION AT LOW FLOW CHANNEL — 2 — S1.1 | S2.7

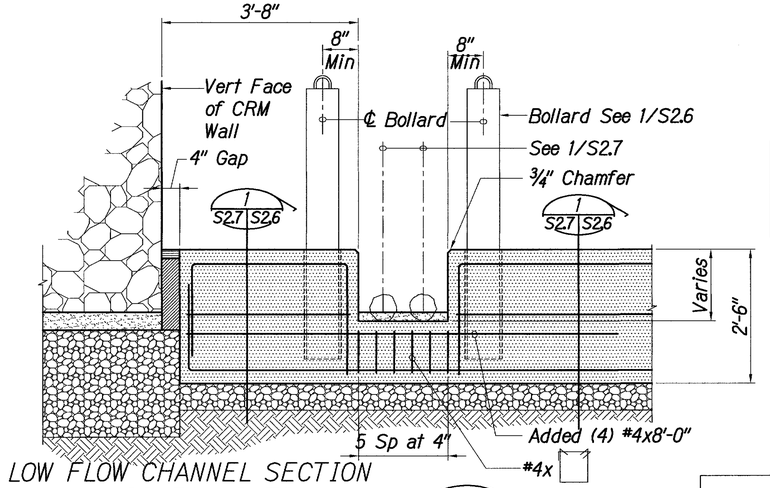
Scale: 3/4" = 1'-0"



LOW FLOW CHANNEL SECTION AT WEST SIDE CRM WALL — 3 — S2.7 | S2.7

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

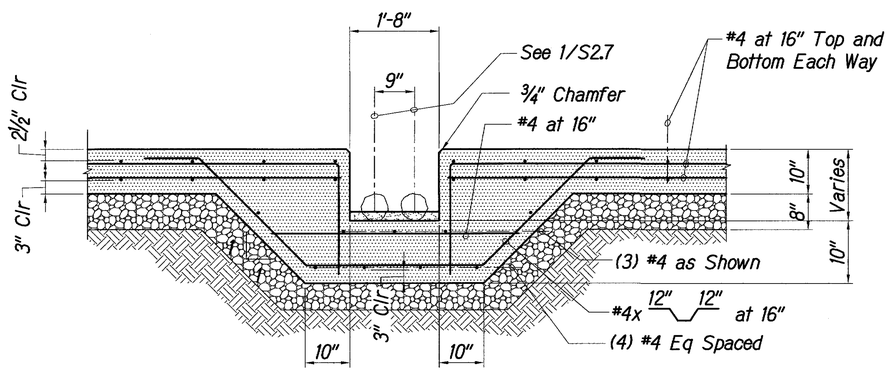
Note:
For balance of information, see 1/S2.5 and 3/S2.5



LOW FLOW CHANNEL SECTION AT BOLLARD FOUNDATION — 4 — S2.7 | S2.7

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

Note:
For balance of information, see 1/S2.5 and 3/S2.5



SECTION — 5 — S2.7 | S2.7

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

LEGEND FOR AS-BUILT POSTINGS

~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

DATE	REVISION
8/10/12	C1 Added W8 Extension to Detail 2

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOW FLOW CHANNEL SECTIONS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

KEN KAZUO HAYASHIDA LICENSED PROFESSIONAL ENGINEER No. 6818-S HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

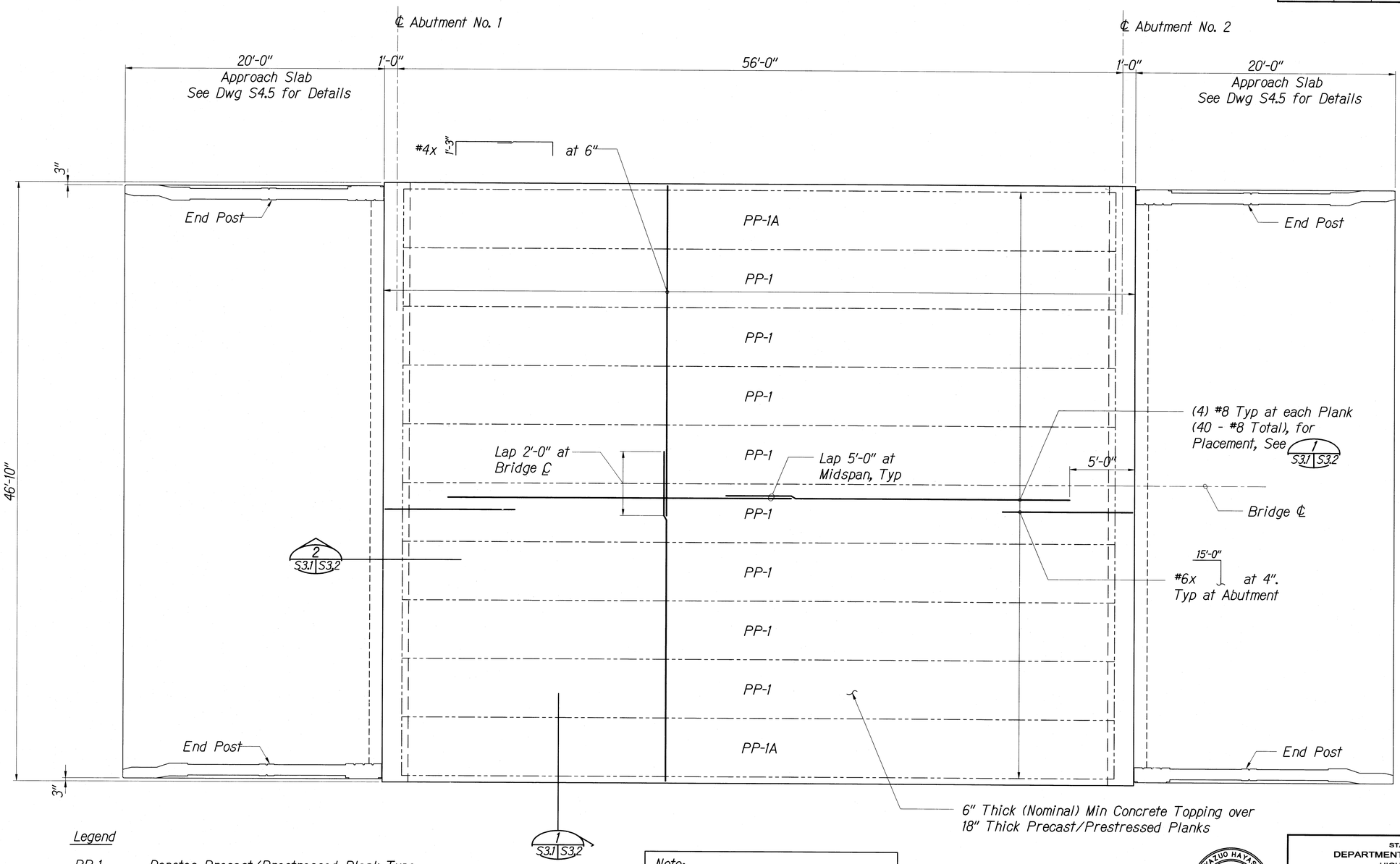
Scale: AS NOTED Date: June, 2010

SHEET No. S2.7 OF 93 SHEETS

"AS-BUILT"

C.O. 72

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	73	93



Legend

PP-1 Denotes Precast/Prestressed Plank Type, See Dwgs S3.3 and S3.4 for Details

Note:
Bridge Railing not Shown for Clarity.

DECK FRAMING PLAN 1 S3.1 S3.1
Scale: 1/4" = 1'-0"

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
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EXPIRATION DATE OF THIS LICENSE 4/30/2012
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

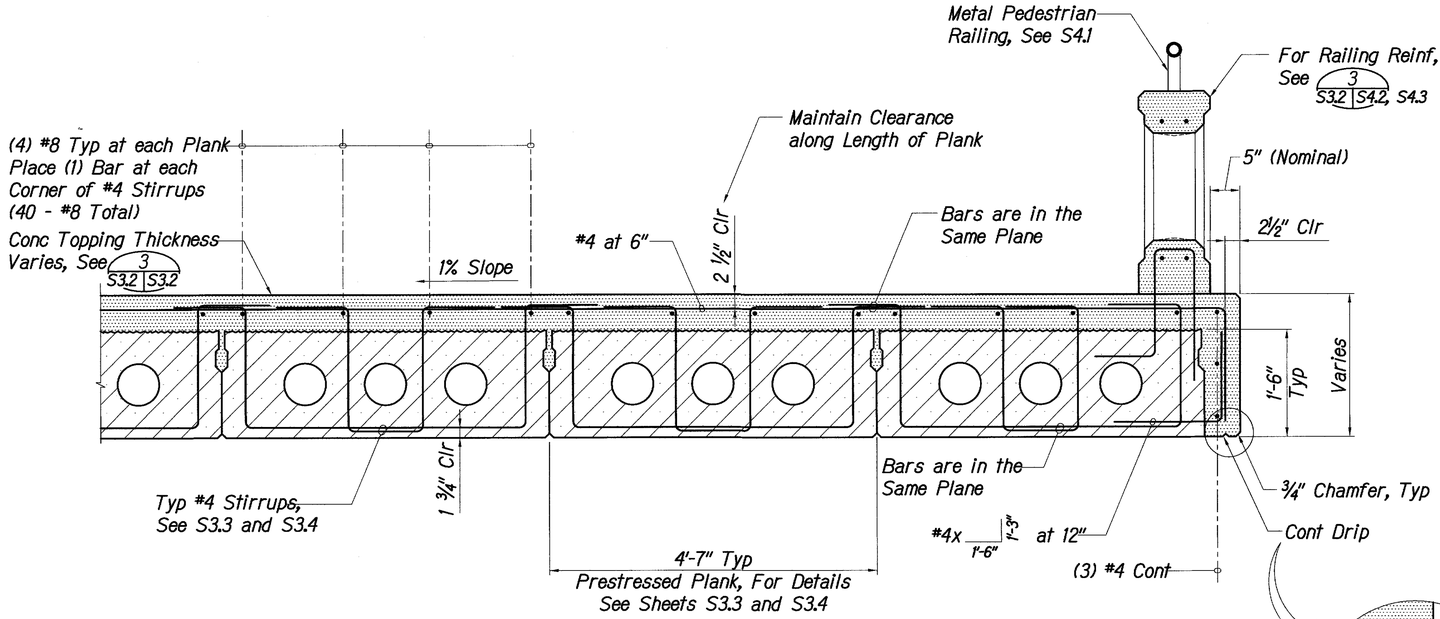
DECK FRAMING AND TOPPING REINFORCING PLAN

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

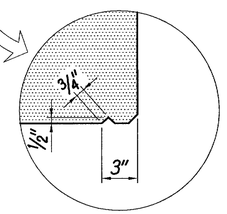
Scale: AS NOTED Date: June, 2010

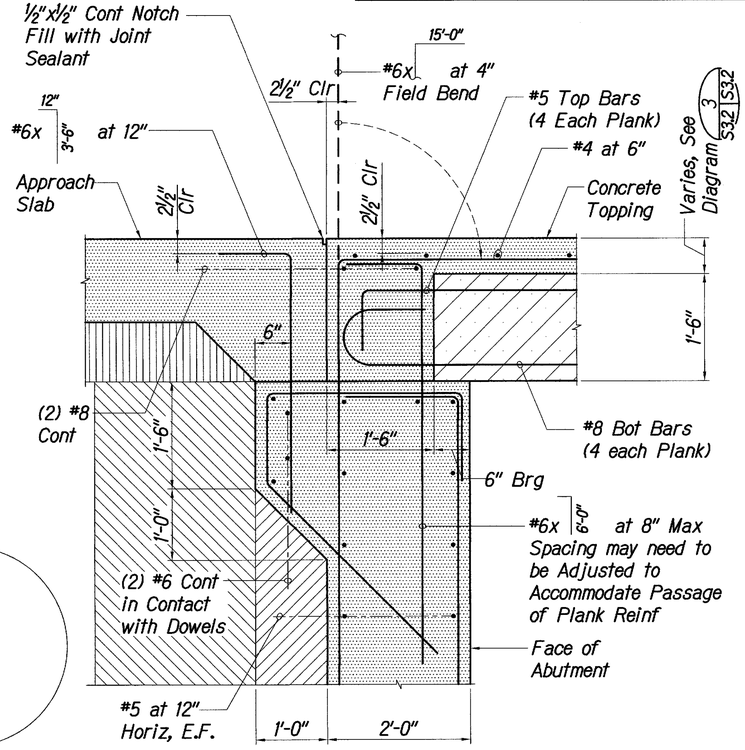
SHEET No. S3.1 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	74	93

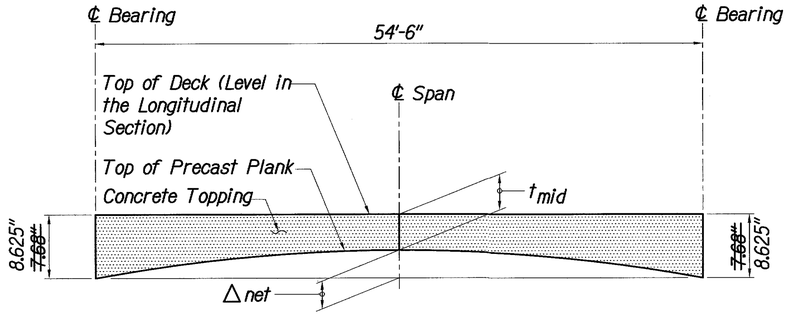


TYPICAL SECTION 1 S3.1 S3.2
Scale: 1" = 1'-0"





SECTION 2 S3.1 S3.2
Scale: 1" = 1'-0"



Legend:

△net = Precast Plank Net Camber after Pouring Concrete Topping (inches).

t_{mid} = 7.68" -△ Net

t_{min} = 5.59" min Concrete Topping Thickness at Midspan

t_{max} = 6.59" max Concrete Topping Thickness at Midspan

CONCRETE TOPPING THICKNESS DIAGRAM ALONG LONGITUDINAL SECTION 3 S3.2 S3.2
Not to Scale

LEGEND FOR AS-BUILT POSTINGS	
~~^^^^^~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
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HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DECK SECTIONS AND DETAILS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

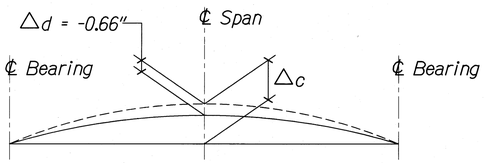
Scale: AS NOTED Date: June, 2010

SHEET No. S3.2 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	75	93

PRESTRESSED PLANK NOTES:

1. Prestressed Concrete 28 Day Strength f'c = 7,000 psi. Prestressed Concrete Strength at time of release fci = 5,500 psi.
2. Prestressing Strands shall be (7) Wire 1/2"ø Low Relaxation Steel Strands (Area = 0.153 in^2) conforming to ASTM A416 with an Ultimate Tensile Strength of 270 ksi. Initial Strand Stress (before any Losses) = 202.5 ksi.
3. Non-Prestressed reinforcing Steel shall be deformed bars conforming to ASTM A615, Grade 60, unless noted otherwise.
4. Strand Pattern shall be symmetrical about the Longitudinal ℄ of the Plank.
5. Strand release sequence shall not induce any Lateral Deflection of the Plank.
6. Contractor shall submit shop drawings indicating Proposed Strand Pattern, releasing sequence, Reinforcing details and Hold Down Device details to the Engineer prior to fabrication.
7. During curing, care shall be taken to avoid any Lateral Deflection to the Plank due to improper orientation. Steam curing may be used to accelerate Strength Gain.
8. Lifting Devices shall be placed as close as possible to the Centerline of Bearings of the Plank. Details and locations of Lifting Devices shall be submitted to the Engineer for approval. Such approval does not Relieve the Contractor of his responsibilities if Plank is damaged due to failure of the Lifting Device.
9. $P_{(e)}$ Effective Prestress Force after all Losses (KIPS)
10. L = 55'-0" (Prestressed Plank length)
11. The stirrup and "U" bar spacing for Plank PP-1A allows for installation of 8" wide x 4" high scupper openings and window openings as shown on Sheets S4.1 and S4.4. Contractor shall take special care in locating these rebars.

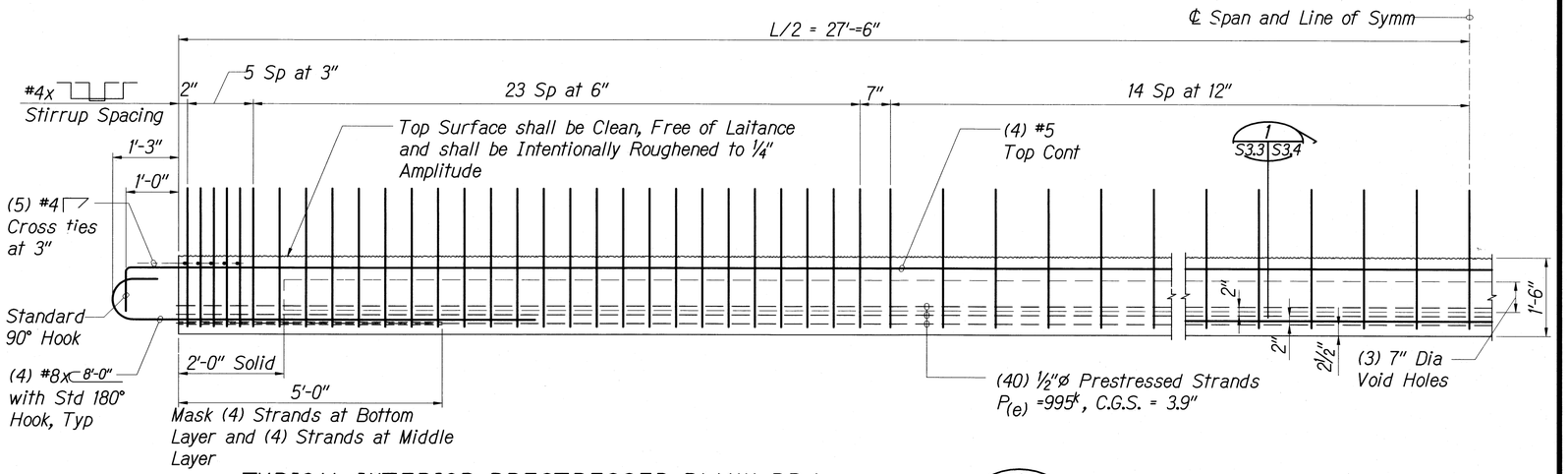


PRESTRESSED PLANK CAMBER DIAGRAM

	Calculated Camber $\triangle_c$
2 Days after Release of Prestress	1.30"
at Erection	2.25"

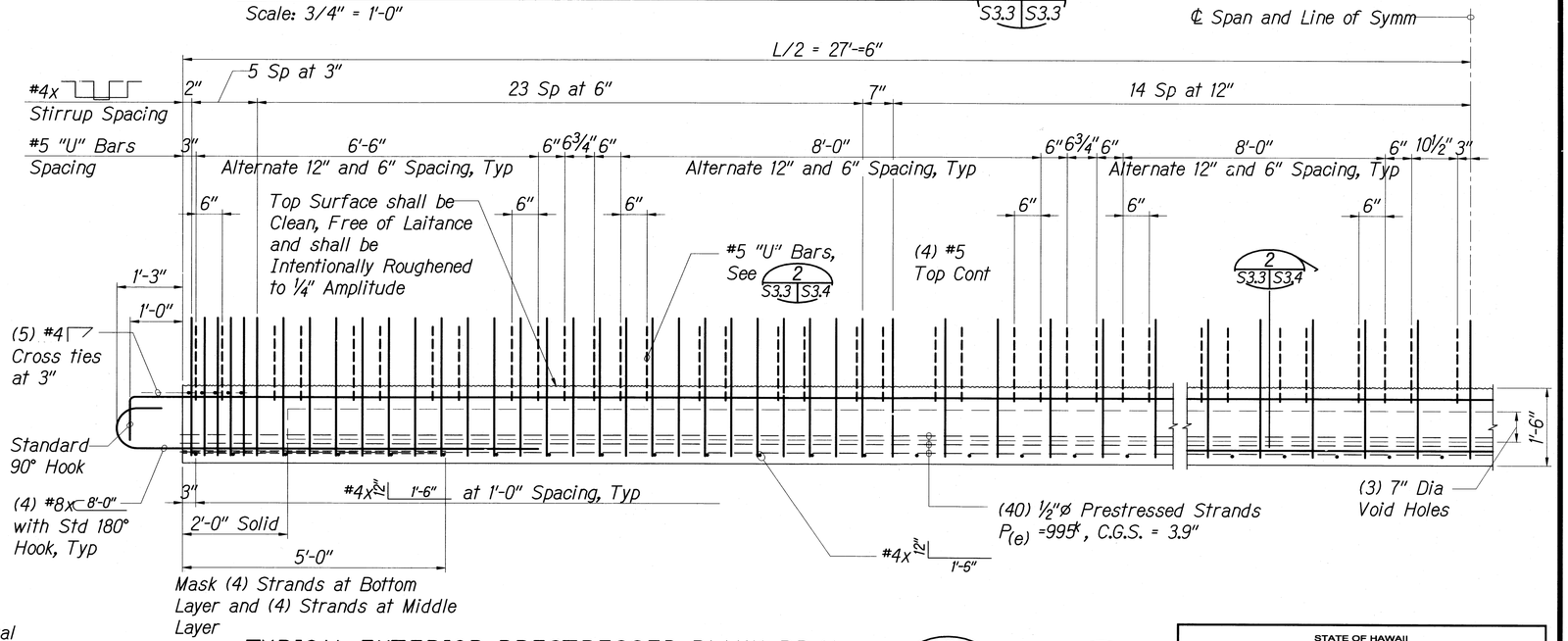
CAMBER DIAGRAM NOTES:

1. The Calculated Camber, $\triangle_c$, includes the Effects of the initial Prestress Force and the Weight of the Precast Plank after removal from the Bed. The Calculated Camber value has been Multiplied by Creep factors to approximate the Effect of Camber growth and concrete Creep. Positive values indicate a net Upward Deflection.
2. Camber values were obtained using Modulus of Elasticity, E = 3,867 ksi for concrete strength of 5,500 psi ,(k = 0.86 in AASHTO LRFD equation 5.4.2.4-1). Type of aggregate to be used in all the Girders shall be obtained from a Single supplier and Quarry site.



TYPICAL INTERIOR PRESTRESSED PLANK PP-1 (1 / S3.3 | S3.3)

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



TYPICAL EXTERIOR PRESTRESSED PLANK PP-1A (2 / S3.3 | S3.3)

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

3. The Contractor shall measure the Actual Camber of each Girder no more than 2 days after the Release of Prestress and again just before Erection in the field. Actual Camber shall not vary from the Calculated values by ± 1/2".
4. Dead Load deflection, $\triangle_d$, is due to the Weight of the Concrete Topping.

KEN KAZUO HAYASHIDA LICENSED PROFESSIONAL ENGINEER No. 6818-S HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL PRESTRESSED PLANK LONGITUDINAL SECTIONS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

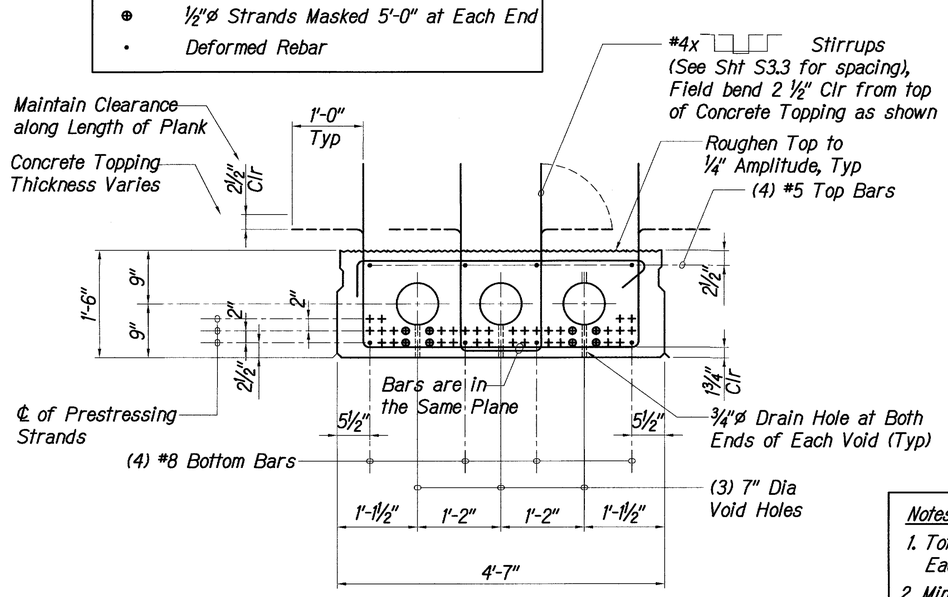
Scale: AS NOTED Date: June, 2010

SHEET No. S3.3 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	76	93

Legend

- + ½"ø Strands
- ⊕ ½"ø Strands Masked 5'-0" at Each End
- • Deformed Rebar

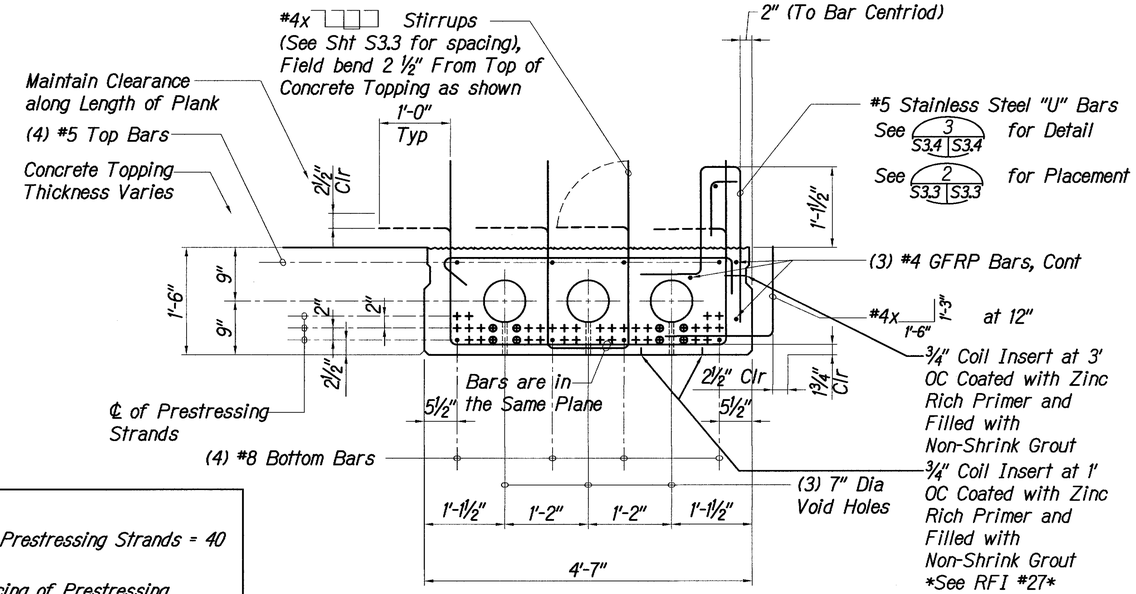


SECTION - PRESTRESSED PLANK PP-1 (1 / S3.3 | S3.4)

Scale: 1" = 1'-0"

Notes:

1. Total No. of Prestressing Strands = 40 Each Plank.
2. Minimum spacing of Prestressing Strand shall be 2" o.c.

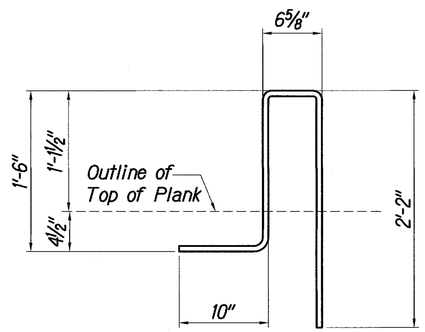


SECTION - PRESTRESSED PLANK PP-1A (2 / S3.3 | S3.4)

Scale: 1" = 1'-0"

Notes:

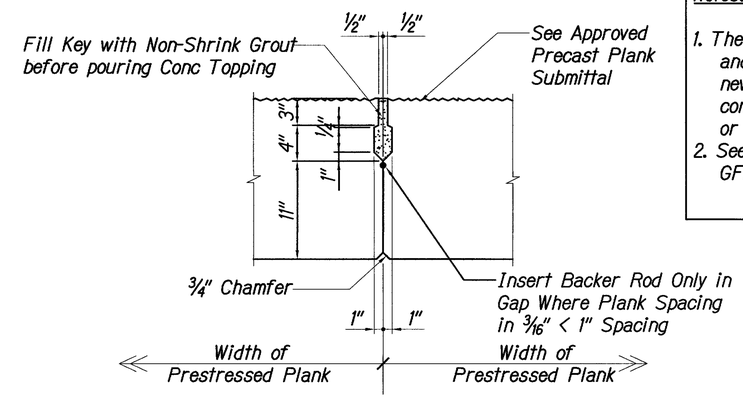
1. The stainless steel rebar shall be supported only by GFRP rebar and not carbon steel rebar. The stainless steel rebars shall never come in contact with carbon steel bars. Tie wires for connecting all stainless steel rebar shall be stainless steel wire or non-metallic wire.
2. See reinforcing steel Note E, sheet S0.1, for specifications on GFRP rebar.



Note:
"U" Bar shall be #5 Deformed Stainless Steel Bars, Type 316, Grade 60 Conforming to ASTM A955.

"U" BAR (#5) DETAIL (3 / S3.4 | S3.4)

Not to Scale



Note:
Non-Shrink Grout shall have a 7-Day Compressive Strength of 6,000 psi.

TYPICAL PLANK KEY DETAIL (4 / S3.4 | S3.4)

Not to Scale

LEGEND FOR AS-BUILT POSTINGS

~~AAAAA~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
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EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PRESTRESSED PLANK SECTIONS AND DETAILS

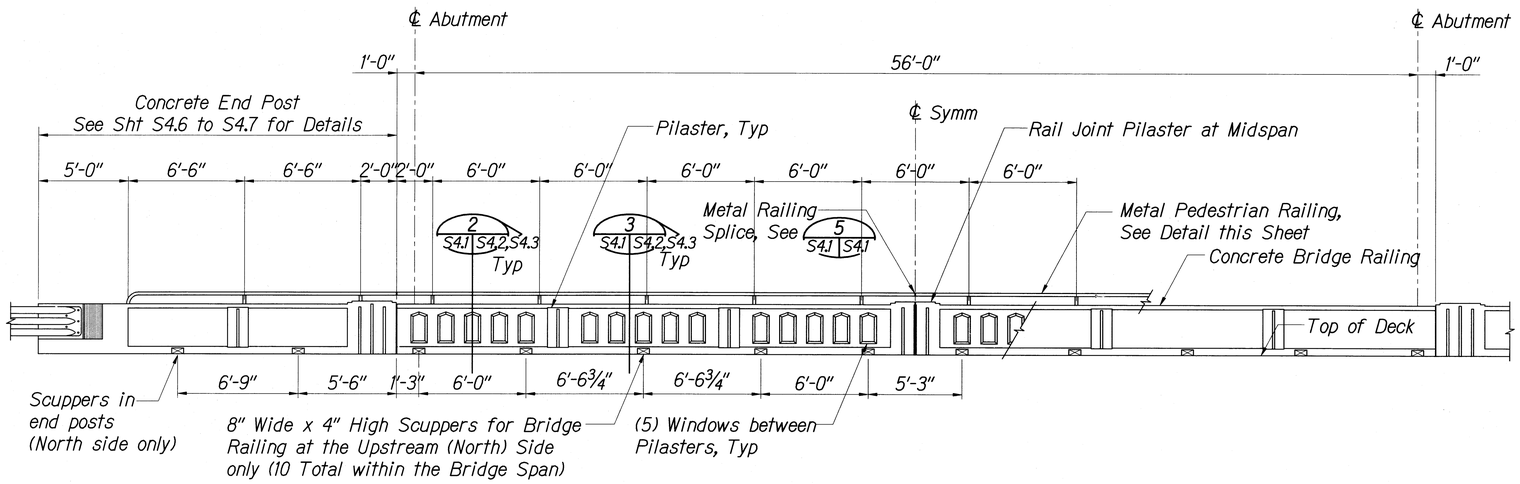
KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S3.4 OF 93 SHEETS

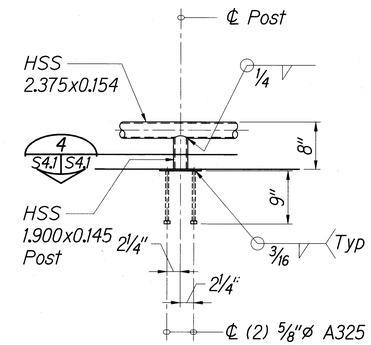
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	77	93



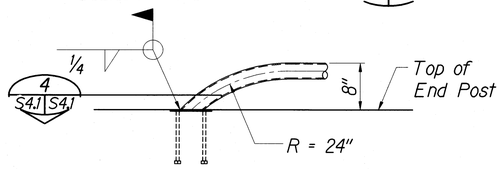
BRIDGE RAILING ELEVATION (1 S4.1 | S4.1)

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



TYPICAL RAILING - POST CONNECTION (2 S4.1 | S4.1)

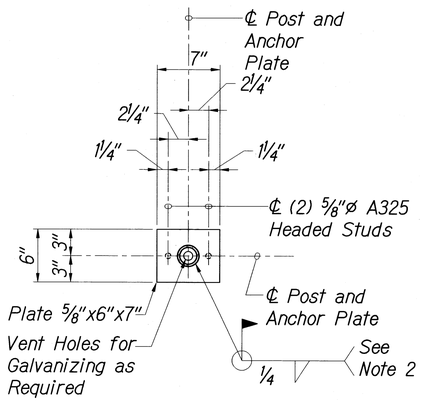
Scale: 1" = 1'-0"



Note:
For Balance of Information, See 2 S4.1 | S4.1

TYPICAL RAILING - END POST CONN (3 S4.1 | S4.1)

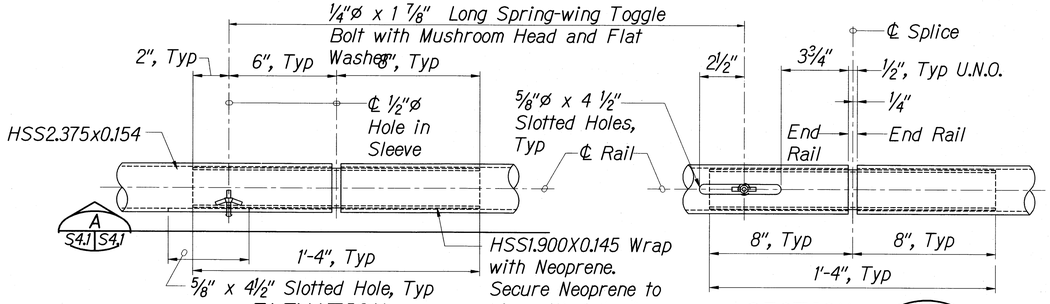
Scale: 1" = 1'-0"



TYPICAL RAILING - ANCHOR PLATE DETAIL (4 S4.1 | S4.1)

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

Notes:
1. All reinforcing steel in bridge railing shall be deformed, stainless steel bars Type 316 Grade 60 conforming to ASTM A995.
2. Bars "U" (#5) by precast/prestressed plank supplier.
3. The stirrup and "U" bar spacing as shown on Sht 3.3 allows for installation of 8" wide x 4" high scupper openings and window openings. Contractor shall take special care in locating these rebars (Plank PP-1A).
4. Metal Pedestrian Railing:
   A. The metal pedestrian railings shall be hot dip galvanized after fabrication and shop painted according to Paint Schedule, Sht. S0.2.
   B. The metal railing posts shall be field welded to embedded plate in the top of concrete railing as shown on Sht. S4.1.
      a. After welding is complete, remove all weld slag, splatter, damaged galvanizing material, and all other welding by-products from the surface of the railing posts and embedded plates.
      b. Prepare surface of steel per SSPC-SP1.
      c. Rust scale shall be cleaned per SSPC-SP3.
      d. Apply (2) coats of cold applied, galvanizing compound containing 95% metallic zinc content by weight in dry film and 52% solids content by volume.
      e. The coating shall be well stirred before use so that it is completely homogeneous during application.
      f. Minimum dry film build is 3 mils, using manufacturer's recoat time directions.
      g. The coating shall be applied at sufficient wet film thickness to achieve a minimum dry film.
      h. Apply paint system according to paint schedule Sht. S0.2.



ELEVATION

Not to Scale

SECTION A (A S4.1 | S4.1)

Not to Scale

Notes:
1. Slotted Hole and Toggle Bolt shall be Located on Underside of pipe.
2. After Field Welding, Clean and Coat Damaged Galvanized Coating According to Note 7, Metal Pedestrian Railing, Sheet S0.1.
3. All field welds shall be tested in accordance with Note 6.B.g, Sht S0.1
4. Metal Pedestrian Railing Shall be Painted According to Paint Schedule and Notes, Sheet S0.2.

TYPICAL PIPE SPLICE DETAIL (5 S4.1 | S4.1)

Not to Scale

KEN KAZUO HAYASHIDA LICENSED PROFESSIONAL ENGINEER No. 6818-S HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

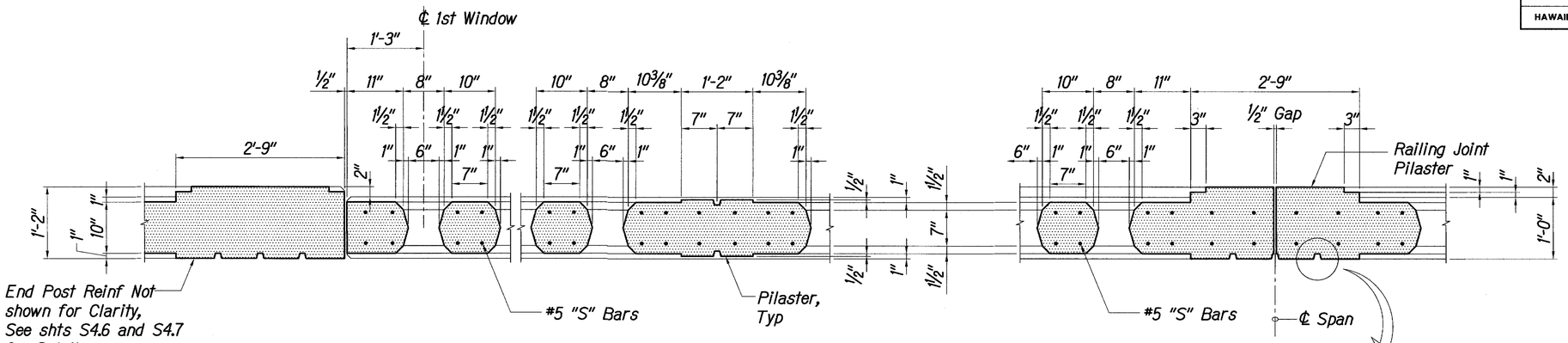
BRIDGE RAILING DETAILS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

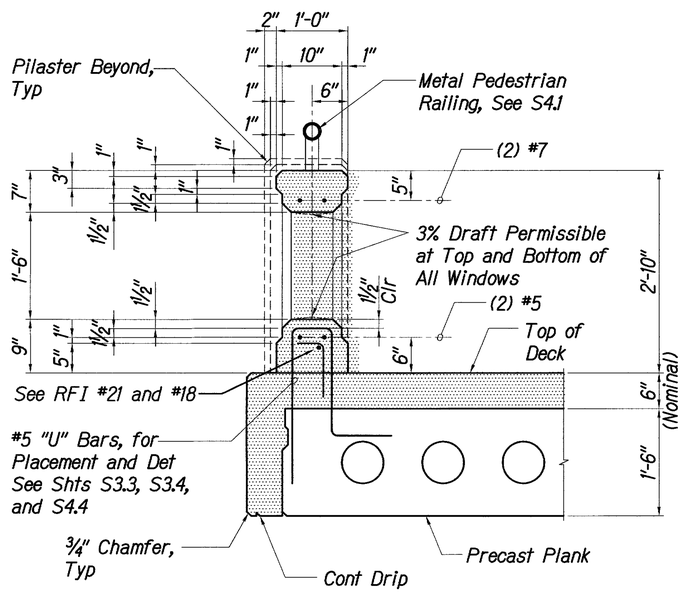
Scale: AS NOTED Date: June, 2010

SHEET No. S4.1 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	78	93

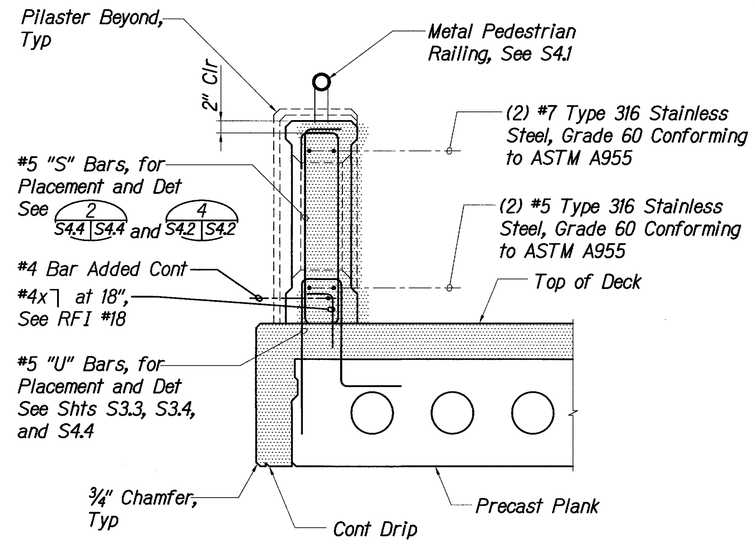


PLAN SECTION 1 — Scale: 1" = 1'-0" — S4.2 | S4.2



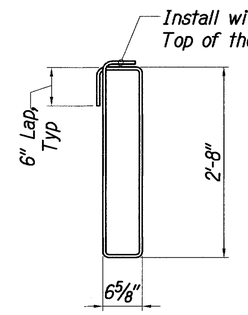
Note:
Concrete Topping and Precast Plank's reinforcing not shown for Clarity.

SECTION THRU WINDOW 2 — Scale: 1" = 1'-0" — S4.1, S4.4 | S4.2



Note:
For Balance of Information, See 4 S4.1, S4.4 | S4.2

SECTION THRU POST 3 — Scale: 1" = 1'-0" — S4.1, S4.4 | S4.2



LEGEND FOR AS-BUILT POSTINGS	
~~	Squiggly line for as-built deletion
~~196.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

Note:
"S" Bar shall be #5 Deformed Stainless Steel Bars, Type 316, Grade 60 Conforming to ASTM A955.

"S" BAR (#5) DETAIL 4 — Not to Scale — S4.2 | S4.2

KEN KAZUO HAYASHIDA — LICENSED PROFESSIONAL ENGINEER — No. 6818-S — HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

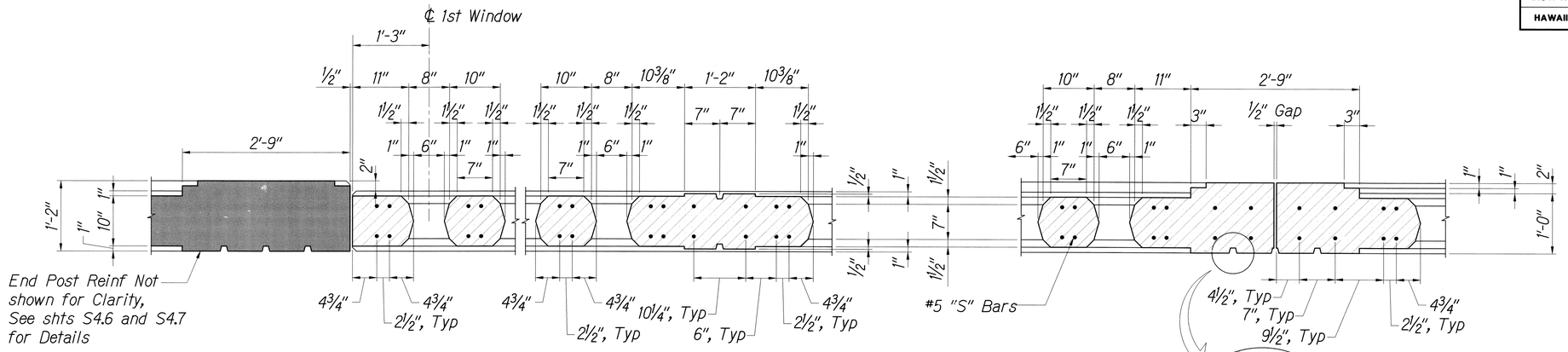
BRIDGE RAILING DETAILS, OPTION 1: CAST-IN-PLACE

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

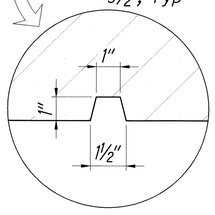
Scale: AS NOTED Date: June, 2010

SHEET No. S4.2 OF 93 SHEETS

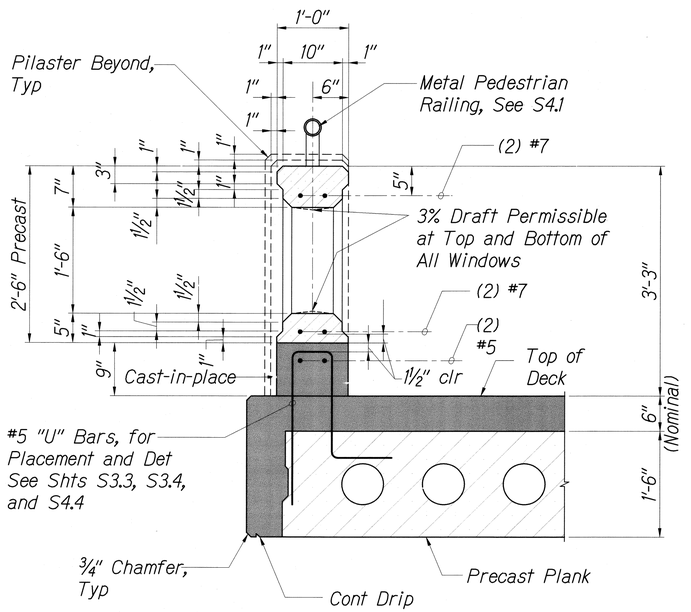
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	79	93



PLAN SECTION 1 (S4.3 | S4.3)
Scale: 1" = 1'-0"

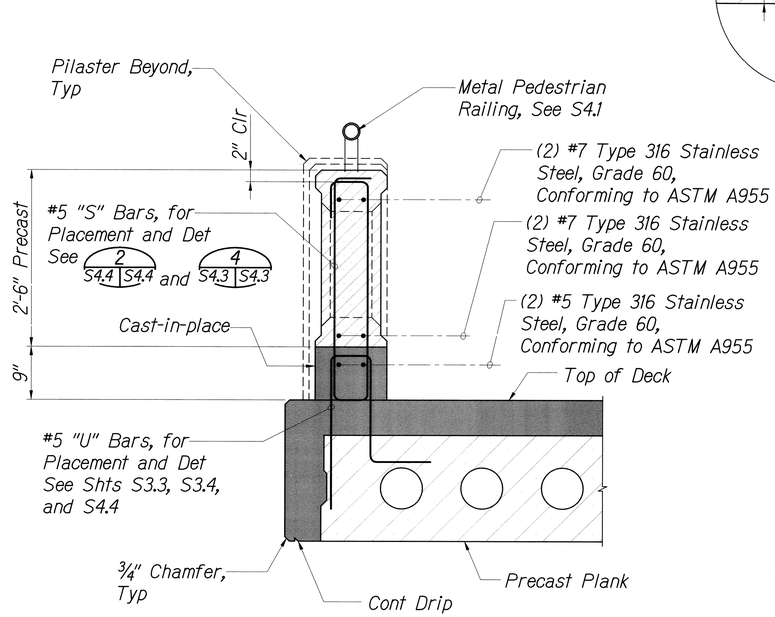


Note:
Typical for Bridge Railing and End Post



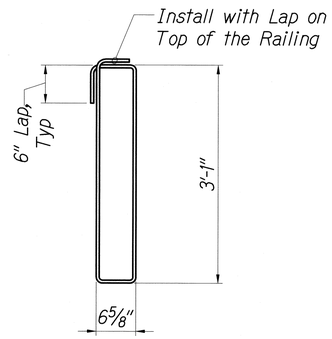
Note:
Concrete Topping and Precast Plank's reinforcing not shown for Clarity.

SECTION THRU WINDOW 2 (S4.1, S4.4 | S4.3)
Scale: 1" = 1'-0"



Note:
For Balance of Information, See 2 (S4.1, S4.4 | S4.3)

SECTION THRU POST 3 (S4.1, S4.4 | S4.3)
Scale: 1" = 1'-0"



Note:
"S" Bar shall be #5 Deformed Stainless Steel Bars, Type 316, Grade 60 Conforming to ASTM A955.

"S" BAR (#5) DETAIL 4 (S4.3 | S4.3)
Not to Scale

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

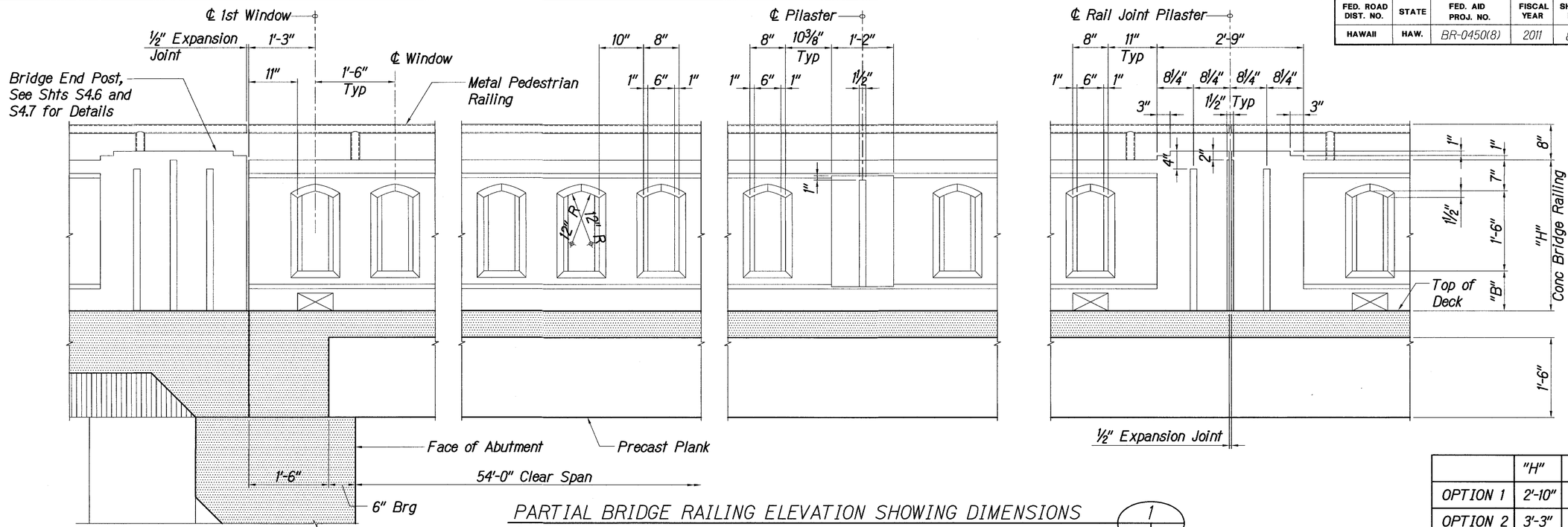
BRIDGE RAILING DETAILS, OPTION 2: PRECAST

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S4.3 OF 93 SHEETS

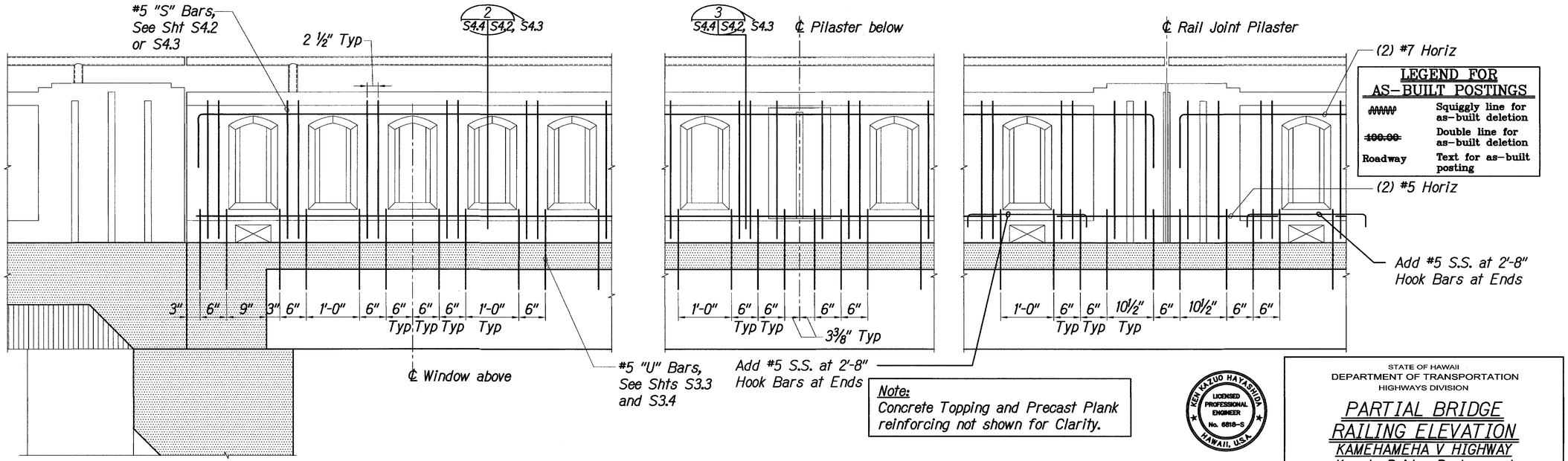
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	80	93



PARTIAL BRIDGE RAILING ELEVATION SHOWING DIMENSIONS (1 S4.4 | S4.4)

Scale: 1" = 1'-0"

	"H"	"B"
OPTION 1	2'-10"	9"
OPTION 2	3'-3"	1'-2"



LEGEND FOR AS-BUILT POSTINGS

~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

Note:
Concrete Topping and Precast Plank reinforcing not shown for Clarity.

PARTIAL BRIDGE RAILING ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT (2 S4.4 | S4.4)

Scale: 1" = 1'-0"

KEN KAZUO HAYASHIDA LICENSED PROFESSIONAL ENGINEER No. 6818-S HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

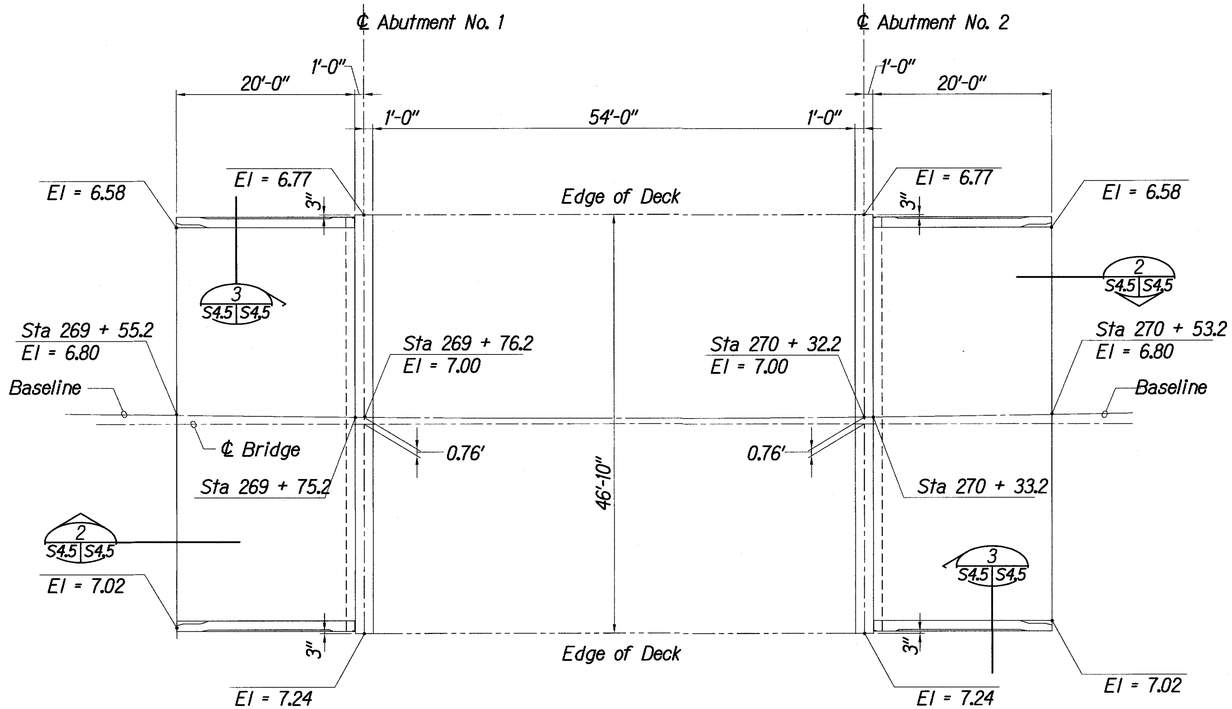
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PARTIAL BRIDGE RAILING ELEVATION
KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

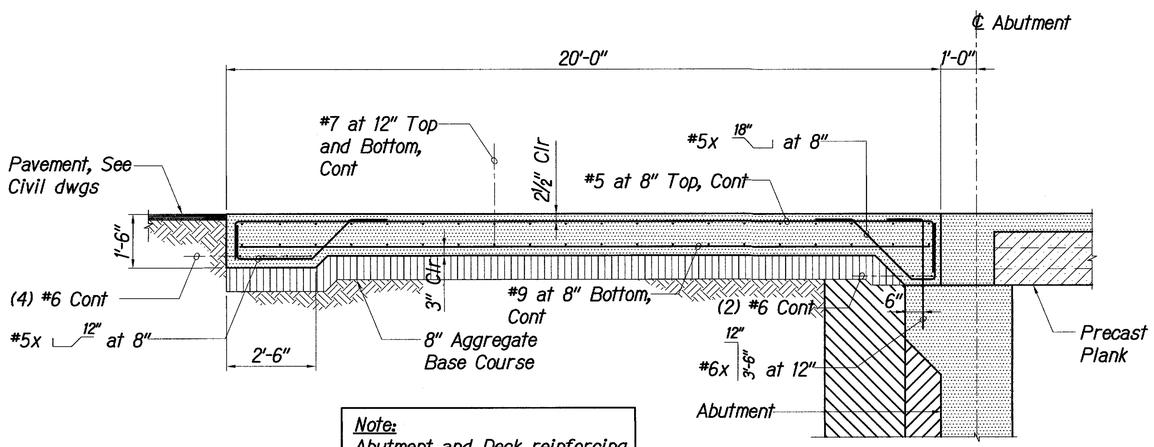
SHEET No. S4.4 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	81	93



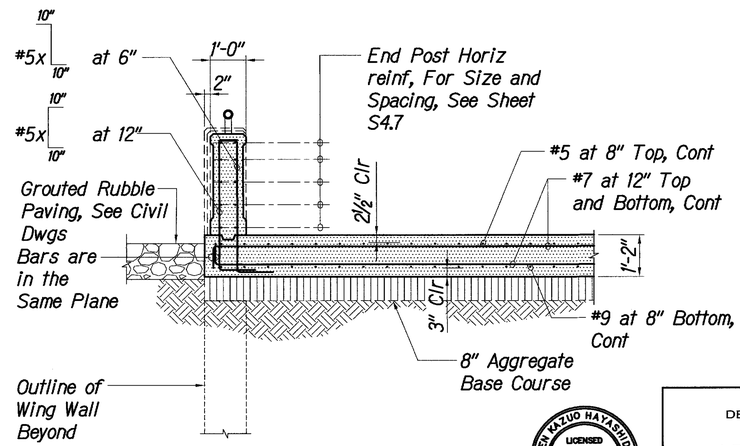
Note:
All Elevations are at the Top of Slab.

PLAN - APPROACH SLAB (1 / S4.5 | S4.5)
Scale: 1/8" = 1'-0"



Note:
Abutment and Deck reinforcing not shown for Clarity.

TYPICAL APPROACH SLAB SECTION (2 / S4.5 | S4.5)
Scale: 1/2" = 1'-0"



SECTION (3 / S4.5 | S4.5)
Scale: 1/2" = 1'-0"

LEGEND FOR AS-BUILT POSTINGS

~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

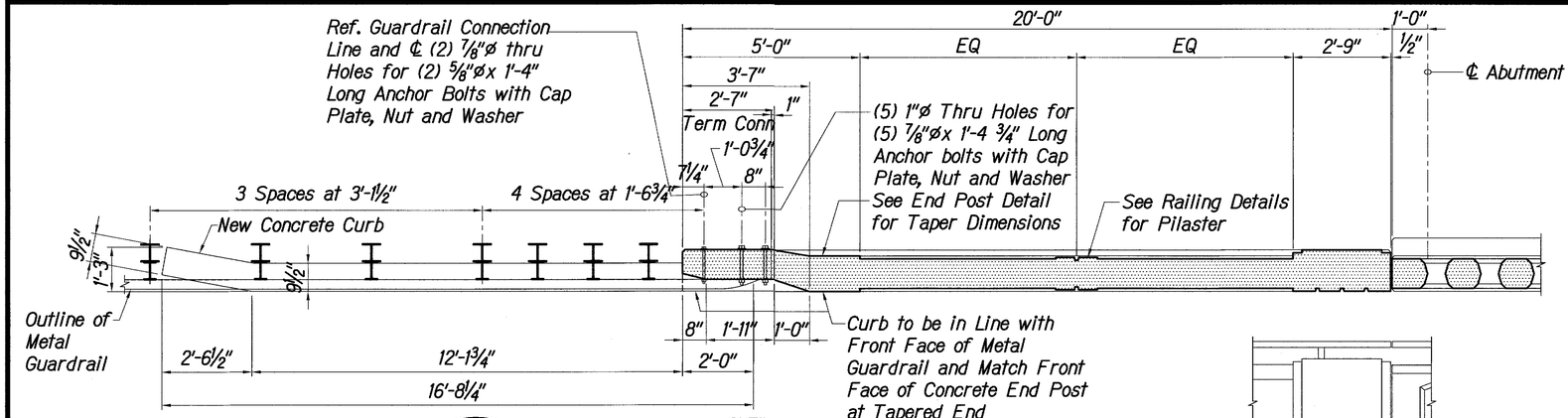
APPROACH SLAB PLAN AND SECTIONS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

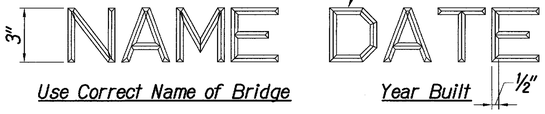
Scale: AS NOTED Date: June, 2010

SHEET No. S4.5 OF 93 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	82	93



Pilaster Exterior Elevation



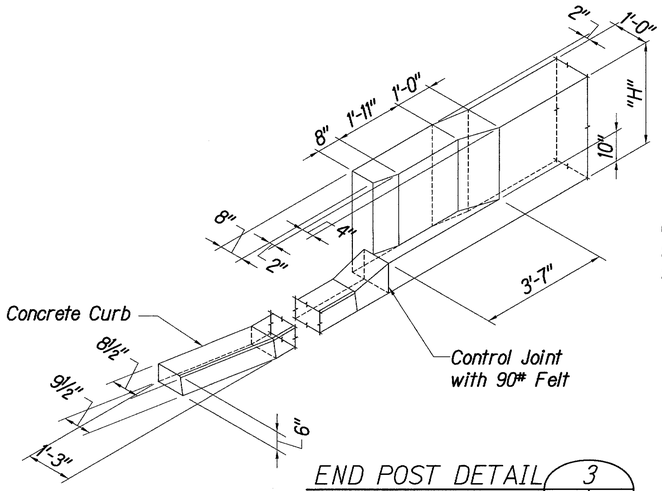
Use Correct Name of Bridge

Year Built

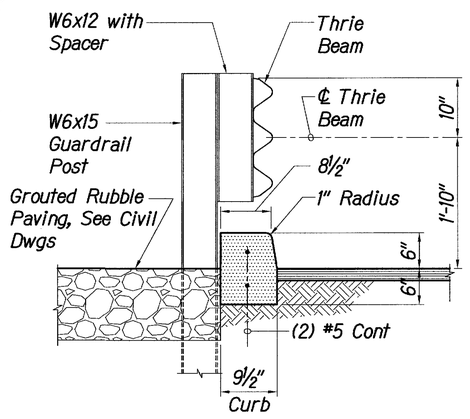
Notes:
1. Unless otherwise Directed by the Engineer, The Bridge Name and Date shall be placed at the "Trailing" end Post on each side of the roadway.
2. Exact details and spacing of letter and figures and location shall be as directed by the Engineer. Gothic letters and figures approximating dimensions shown will be acceptable if approved by the Engineer.

TYPICAL DETAIL OF LETTERS AND FIGURES AT CONCRETE END POST BRIDGE IDENTIFICATION DETAIL

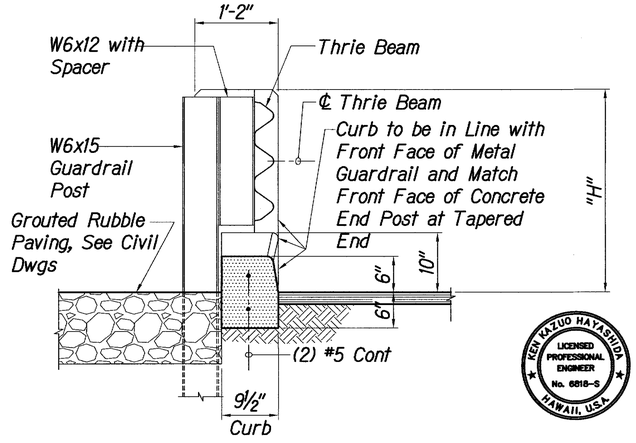
Not to Scale



END POST DETAIL
Scale: 1/2" = 1'-0"
3
S4.6 S4.6



SECTION
Scale: 1" = 1'-0"
4
S4.6 S4.6



SECTION
Scale: 1" = 1'-0"
5
S4.6 S4.6

LEGEND FOR AS-BUILT POSTINGS

~~WWW~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

KEN KAZUO HAYASHIDA LICENSED PROFESSIONAL ENGINEER No. 6818-S HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

END POST PLAN, ELEVATION AND DETAILS

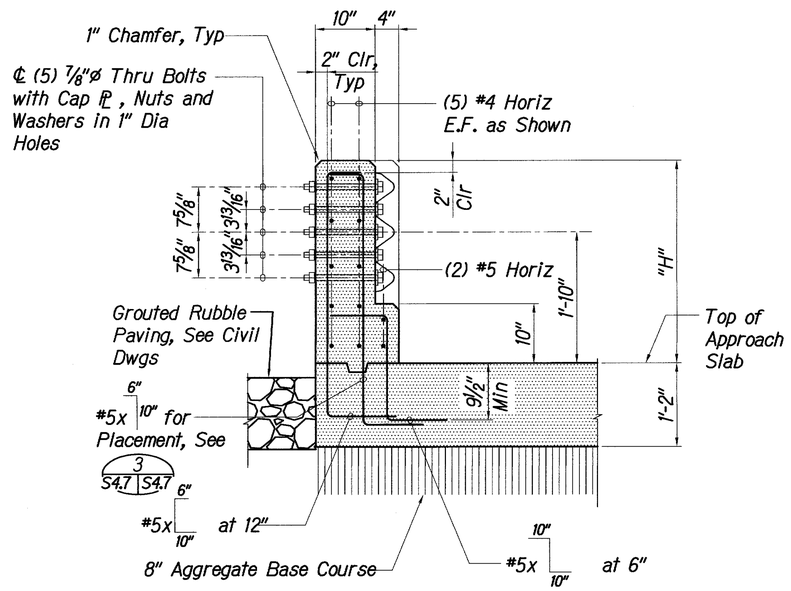
KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S4.6 OF 93 SHEETS

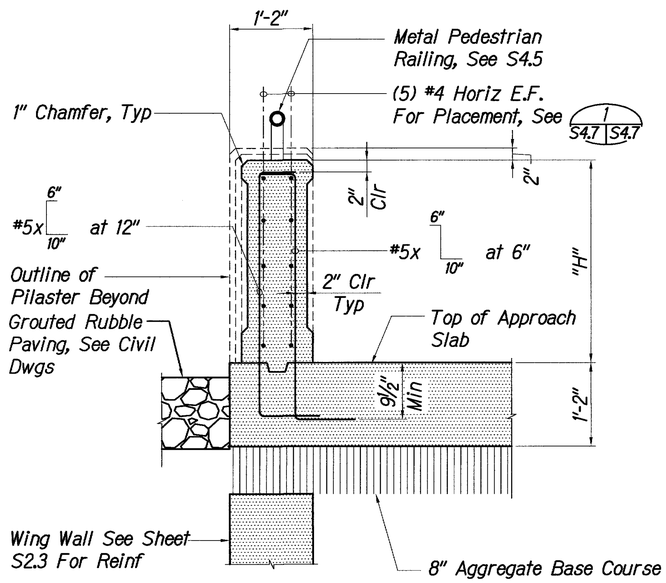
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-0450(8)	2011	83	93



Note:
Approach Slab Reinforcement not Shown for Clarity.

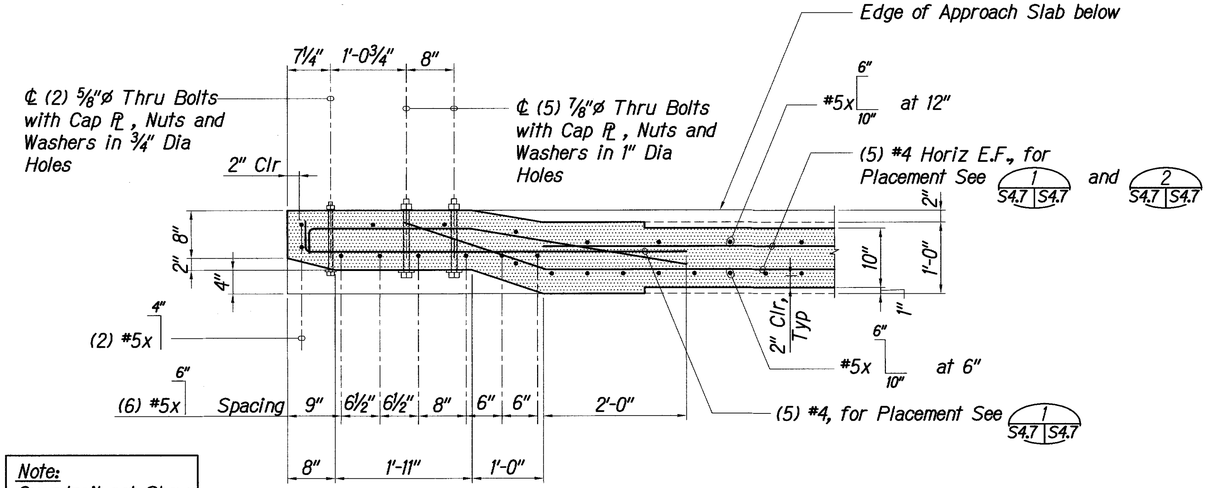
SECTION 1 — Scale: 1" = 1'-0" — S4.7 | S4.7



Note:
Approach Slab Reinforcement not Shown for Clarity.

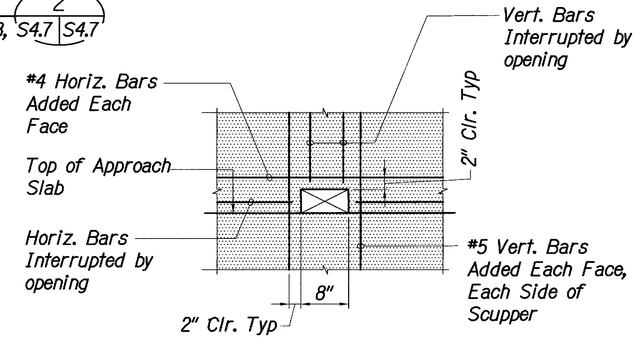
SECTION 2 — Scale: 1" = 1'-0" — S2.3, S4.7 | S4.7

Note:
For Balance of Dimensions, See Railing Details Sheets S4.2 thru S4.4



Note:
Guardrail not Shown for Clarity

PARTIAL PLAN SECTION SHOWING REINF. 3 — Scale: 1" = 1'-0" — S4.6 | S4.7



TYPICAL ADDED REINF. AT SCUPPER OPENING 4 — Scale: 1" = 1'-0" — S4.7 | S4.7

LEGEND FOR AS-BUILT POSTINGS

wwww	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

KEN KAZUO HAYASHIDA — LICENSED PROFESSIONAL ENGINEER — No. 6818-S — HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2012
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

END POST SECTIONS AND DETAILS

KAMEHAMEHA V HIGHWAY
Kawela Bridge Replacement
Federal Aid Project No. BR-0450(8)

Scale: AS NOTED Date: June, 2010

SHEET No. S4.7 OF 93 SHEETS