SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	CONTRACT ITEM	QUANTITY	UNIT
202.0500	REMOVAL OF HEADWALLS AT EXISTING CULVERT FOR WATERWAY STRUCTURE NO. 3	L.S.	L.S.
202.0501	REMOVAL OF HEADWALLS AT EXISTING CULVERT FOR WATERWAY STRUCTURE NO. 4	L.S.	L.S.
202.0601	REMOVAL OF EXISTING WING WALL AT EXISTING HAIKU CULVERT NO. 1	L.S.	L.S.
202.0603	REMOVAL OF EXISTING WING WALL AT EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.
202.0604	REMOVAL OF EXISTING WING WALL AT EXISTING KAUHIKOA CULVERT NO. 4	L.S.	L.S.
206.6001	STRUCTURE EXCAVATION FOR WATERWAY STRUCTURE NO. 1	L.S.	L.S.
206.6002	STRUCTURE EXCAVATION FOR WATERWAY STRUCTURE NO. 2	L.S.	L.S.
206.6003	STRUCTURE EXCAVATION FOR WATERWAY STRUCTURE NO. 3	L.S.	L.S.
206.6004	STRUCTURE EXCAVATION FOR WATERWAY STRUCTURE NO. 4	L.S.	L.S.
206.6101	STRUCTURE EXCAVATION FOR NEW RETROFIT CONCRETE END POST FOR EXISTING HAIKU CULVERT NO. 1	L.S.	L.S.
206.6103	STRUCTURE EXCAVATION FOR NEW RETROFIT CONCRETE END POST FOR EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.
206.6104	STRUCTURE EXCAVATION FOR NEW RETROFIT CONCRETE END POST FOR EXISTING KAUHIKOA CULVERT NO. 4	L.S.	L.S.
206.7201	STRUCTURE BACKFILL FOR WATERWAY STRUCTURE NO. 1	L.S.	L.S.
206.7202	STRUCTURE BACKFILL FOR WATERWAY STRUCTURE NO. 2	L.S.	L.S.
206.7203	STRUCTURE BACKFILL FOR WATERWAY STRUCTURE NO. 3	L.S.	L.S.
206.7204	STRUCTURE BACKFILL FOR WATERWAY STRUCTURE NO. 4	L.S.	L.S.
206.7301	STRUCTURE BACKFILL FOR NEW RETROFIT CONCRETE END POST FOR EXISTING HAIKU CULVERT NO. 1	L.S.	L.S.
206.7303	STRUCTURE BACKFILL FOR NEW RETROFIT CONCRETE END POST FOR EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.
206.7304	STRUCTURE BACKFILL FOR NEW RETROFIT CONCRETE END POST FOR EXISTING KAUHIKOA CULVERT NO. 4	L.S.	L.S.
503.1091	CONCRETE IN WATERWAY STRUCTURE NO. 1	L.S.	L.S.
503.1092	CONCRETE IN WATERWAY STRUCTURE NO. 2	L.S.	L.S.
503.1093	CONCRETE IN WATERWAY STRUCTURE NO. 3	L.S.	L.S.
503.1094	CONCRETE IN WATERWAY STRUCTURE NO. 4	L.S.	L.S.
503.6001	CONCRETE IN NEW RETROFIT CONCRETE END POST FOR EXISTING HAIKU CULVERT NO. 1	L.S.	L.S.
503.6003	CONCRETE IN NEW RETROFIT CONCRETE END POST FOR EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.
503.6004	CONCRETE IN NEW RETROFIT CONCRETE END POST FOR EXISTING KAUHIKOA CULVERT NO. 4	L.S.	L.S.
504.4501	12-INCHES PRESTRESSED PLANKS FOR WATERWAY STRUCTURE NO. 1	L.S.	L.S.
504.4502	12-INCHES PRESTRESSED PLANKS FOR WATERWAY STRUCTURE NO. 2	L.S.	L.S.
504.4503	18-INCHES PRESTRESSED PLANKS FOR WATERWAY STRUCTURE NO. 3	L.S.	L.S.
504.4504	10-INCHES PRESTRESSED PLANKS FOR WATERWAY STRUCTURE NO. 4	L.S.	L.S.
507.0101	METAL RAILING FOR WATERWAY STRUCTURE NO. 1	L.S.	L.S.
507.0102	METAL RAILING FOR WATERWAY STRUCTURE NO. 2	L.S.	L.S.
507.0103	METAL RAILING FOR WATERWAY STRUCTURE NO. 3	L.S.	L.S.
507.0104	METAL RAILING FOR WATERWAY STRUCTURE NO. 4	L.S.	L.S.
507.0201	METAL BIKE RAILING FOR EXISTING HAIKU CULVERT NO. 1	L.S.	L.S.
507.0203	METAL BIKE RAILING FOR EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.
507.0204	METAL BIKE RAILING FOR EXISTING KAUHIKOA CULVERT NO. 4	L.S.	L.S.
507.1003	CONCRETE PARAPET BUILD-UP FOR EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.
507.7101	CONCRETE PARAPET FOR WATERWAY STRUCTURE NO. 1 (INCLUDING END POST)	L.S.	L.S.
507.7102	CONCRETE PARAPET FOR WATERWAY STRUCTURE NO. 2 (INCLUDING END POST)	L.S.	L.S.
507.7103	CONCRETE PARAPET FOR WATERWAY STRUCTURE NO. 3 (INCLUDING END POST)	L.S.	L.S.
507.7104	CONCRETE PARAPET FOR WATERWAY STRUCTURE NO. 4 (INCLUDING END POST)	L.S.	L.S.
602.0091	REINFORCING STEEL FOR WATERWAY STRUCTURE NO. 1	L.S.	L.S.
602.0092	REINFORCING STEEL FOR WATERWAY STRUCTURE NO. 2	L.S.	L.S.
602.0093	REINFORCING STEEL FOR WATERWAY STRUCTURE NO. 3	L.S.	L.S.
602.0094	REINFORCING STEEL FOR WATERWAY STRUCTURE NO. 4	L.S.	L.S.
602.1091	REINFORCING STEEL FOR NEW RETROFIT CONCRETE END POST FOR EXISTING HAIKU CULVERT NO. 1	L.S.	L.S.
602.1093	REINFORCING STEEL FOR NEW RETROFIT CONCRETE END POST FOR EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.
602.1094	REINFORCING STEEL FOR NEW RETROFIT CONCRETE END POST FOR EXISTING KAUHIKOA CULVERT NO. 4	L.S.	L.S.
606.9001	GUARDRAIL TYPE "A" FOR EXISTING HAIKU CULVERT NO. 1	L.S.	L.S.
606.9002	GUARDRAIL TYPE "B" FOR EXISTING BOX CULVERT NO. 2	L.S.	L.S.
606.9003	GUARDRAIL TYPE "C" FOR EXISTING LOWRIE BRIDGE NO. 3	L.S.	L.S.

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

ORIGINAL PLAN
NOTE BOOK
No. _____

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	234	288

INDEX TO DRAWINGS

DRAW NO.	DESCRIPTION
S-1	INDEX TO DRAWINGS, SUMMARY OF ESTIMATED QUANTITIES
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S-4	WATERWAY STRUCTURE NO. 1 – FOUNDATION / FRAMING PLAN, SLAB ELEVATION PLAN, LONGITUDINAL SECTION / ELEVATION
S-5	WATERWAY STRUCTURE NO. 2 – BRIDGE LAYOUT PLAN, CROSS SECTION, LONGITUDINAL SECTION / ELEVATION
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S-11	TYPICAL BRIDGE FOUNDATION / FRAMING PLAN
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S-26	RETROFIT CONCRETE END POST DETAILS

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

INDEX TO DRAWINGS, SUMMARY OF ESTIMATED QUANTITIES

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-1 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	235	288

STRUCTURAL NOTES

1. GENERAL SPECIFICATIONS: HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION, 1994, TOGETHER WITH SPECIAL PROVISIONS PREPARED FOR THIS CONTRACT.

2. DESIGN SPECIFICATIONS: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, 1998, INCLUDING SUBSEQUENT INTERIM REVISIONS.

3. LOADS:
   - A. DEAD LOADS:
     1. AN ALLOWANCE OF 25 PSF (FROM CURB-TO-CURB) HAS BEEN PROVIDED FOR IN THE DESIGN FOR FUTURE WEARING SURFACE.
     2. AN ALLOWANCE OF 150 PLF (AT EACH SIDE OF THE BRIDGE) HAS BEEN PROVIDED FOR IN THE DESIGN FOR FUTURE UTILITIES.
   - B. LIVE LOAD: HL-93
   - C. SEISIMIC LOAD:
     1. ACCELERATION COEFFICIENT = 0.26
     2. SEISMIC PERFORMANCE ZONE = 3
     3. IMPORTANCE CATEGORY = CRITICAL BRIDGE
     4. SOIL PROFILE TYPE I (S = 1.0)
   - D. RAILING TEST LEVEL = TL-4

4. MATERIALS:
   - A. MINIMUM CONCRETE COMPRESSIVE STRENGTH (AT 28 DAYS):
     1. ALL CONCRETE (EXCEPT PRESTRESSED PLANKS) = 4,000 PSI
   - B. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.
   - C. TETRAGUARD AS20 SHRINKAGE REDUCING ADMIXTURE, ECLIPSE PLUS SHRINKAGE REDUCING ADMIXTURE, OR AN APPROVED EQUAL, SHALL BE INCLUDED IN THE CONCRETE MIX (EXCEPT THE CONCRETE MIX FOR THE PRESTRESSED PLANKS). THE REQUIRED DOSAGE SHALL BE 96 OUNCES PER CUBIC YARD OF CONCRETE OR AS RECOMMENDED BY THE ADMIXTURE MANUFACTURER. ADDITION OF THE SHRINKAGE REDUCING ADMIXTURE SHALL BE AS RECOMMENDED BY THE ADMIXTURE MANUFACTURER.
   - D. FOR MATERIALS OF PRESTRESSED PLANKS, SEE APPLICABLE PRESTRESSED PLANK NOTES.
   - E. THRU BOLTS FOR GUARDRAIL CONNECTION TO END POST SHALL CONFORM TO AASHTO M164 (ASTM A325), UNLESS OTHERWISE NOTED.
   - F. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 AND BE HOT-DIP GALVANIZED AFTER FABRICATION.
   - G. METAL THRIE BEAM, TERMINAL CONNECTOR, BACKUP PLATE AND TRANSITION SECTION SHALL BE FABRICATED FROM 10 GAGE STEEL, HOT-DIP GALVANIZED AFTER FABRICATION AND CONFORM TO THE REQUIREMENTS OF AASHTO M180.
   - H. W6X25 METAL POSTS AND PLATE SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
   - I. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AWS D1.1 "STRUCTURAL WELDING CODE". WELDS SHALL HAVE A MINIMUM ULTIMATE STRENGTH OF 70,000 PSI.
   - J. ALL ANCHOR BOLTS, WASHERS AND NUTS SHALL BE ASTM A325, TYPE I, HOT-DIP GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE NOTED.
   - K. ALL THREADED RODS SHALL BE ASTM A449, TYPE I, HOT-DIP GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE NOTED.
   - L. EPOXY ADHESIVE SHALL BE "GLASS VIAL" OR "DOUBLE CARTRIDGE" TYPE. EPOXIES THAT REQUIRE MANUAL MEASURING OR MIXING WILL NOT BE ALLOWED. EPOXY SHALL MEET THE REQUIREMENTS OF ASTM C881, TYPE IV, GRADE 3, CLASS C.
   - M. A CORROSION INHIBITING ADMIXTURE SHALL BE INCLUDED IN THE CONCRETE MIX FOR THE PRESTRESSED PLANKS. THE CORROSION INHIBITING ADMIXTURE SHALL CONTAIN A MINIMUM OF 30% CALCIUM NITRITE BY MASS AND SHALL BE ADDED AT A DOSAGE RATE OF 4.0 GALLONS PER CUBIC YARD OF CONCRETE. THE ADMIXTURE SHALL BE RHEOCRETE CNI CALCIUM NITRITE-BASED CORROSION INHIBITOR, DCI S CORROSION INHIBITOR, OR AN APPROVED EQUAL. ADDITION OF CORROSION INHIBITING ADMIXTURE SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
   - N. REINFORCING STEEL TO BE WELDED SHALL CONFORM TO ASTM A706, GRADE 60.

5. REINFORCEMENT:
   - A. UNLESS OTHERWISE NOTED, THE COVERING MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY REINFORCING BARS SHALL BE AS FOLLOWS:
     1. DECK TOP BARS = 2" CLEAR (WITH TOLERANCES OF -0 INCH AND +3/8 INCH)
     2. PARAPETS, END POSTS, AND CURBS = 2" CLEAR
     3. FORMED SURFACES EXPOSED TO EARTH AND WEATHER = 2" CLEAR
     4. BOTTOM AND SIDES OF FOOTINGS AND WHERE CONCRETE IS DEPOSITED ON GRADE = 3" CLEAR
     5. BOTTOM OF PRESTRESSED PLANKS = 1" CLEAR (WITH TOLERANCE OF -0 INCH)
   - B. MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS SHALL BE 1-1/2 TIMES THE DIAMETER OF THE BAR (FOR NON BUNDLED BARS) OR 1-1/2 TIMES THE DIAMETER DERIVED FROM THE EQUIVALENT TOTAL AREA OF THE BARS (FOR BUNDLED BARS), BUT IN NO CASE SHALL THE CLEAR DISTANCE BETWEEN THE PARALLEL BARS BE LESS THAN 1-1/2 TIMES THE MAXIMUM SIZE OF THE COARSE AGGREGATE OR 1-1/2 INCHES.
   - C. ALL DIMENSIONS RELATING TO REINFORCING BARS (E.G., SPACING OF BARS, ETC.) ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
   - D. REINFORCING BARS SHALL BE DETAILED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, 1998, INCLUDING SUBSEQUENT INTERIM REVISIONS, UNLESS OTHERWISE NOTED.
   - E. REINFORCING BARS SHALL BE SECURELY TIED AT ALL INTERSECTIONS AND LAP SPLICES EXCEPT WHERE THE SPACING OF THE INTERSECTIONS IS LESS THAN 12 INCHES IN EACH DIRECTION, IN WHICH CASE ALTERNATE INTERSECTIONS SHALL BE TIED.

6. GENERAL CONSTRUCTION NOTES:
   - A. SEE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.
   - B. ALL ITEMS NOTED INCIDENTAL WILL NOT BE PAID FOR SEPARATELY.
   - C. STANDARD DETAIL DRAWINGS REFER TO ALL STRUCTURES IN GENERAL, EXCEPT FOR MODIFICATIONS AS MAY BE REQUIRED FOR SPECIAL CONDITIONS. FOR SUCH MODIFICATIONS, REFER TO THE CORRESPONDING DETAILED DRAWINGS.
   - D. THE CONTRACTOR SHALL COMPLY WITH ALL CONSTRUCTION PERMITS FOR THIS PROJECT. IN ADDITION, THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS OF THE FEDERAL, STATE AND COUNTY GOVERNMENTS.
   - E. UNLESS OTHERWISE NOTED, ALL VERTICAL DIMENSIONS ARE MEASURED PLUMB.
   - F. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS BEFORE COMMENCING WITH WORK.
   - G. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITY LINES AND NOTIFY THE RESPECTIVE OWNERS BEFORE COMMENCING THE WORK OF EXCAVATION.
   - H. FOR CONCRETE FINISH, SEE STANDARD SPECIFICATIONS.
   - I. UNLESS OTHERWISE NOTED, ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4" X 3/4".
   - J. THE CONTRACTOR SHALL TAKE PRECAUTIONARY MEASURES TO PROTECT THE EXISTING CONCRETE DITCHES DURING CONSTRUCTION OF THE NEW WATERWAY STRUCTURES. ANY DAMAGE TO THE EXISTING CONCRETE DITCHES SHALL BE REPAIRED AT NO COST TO THE STATE.
   - K. ALL CUT REINFORCING BARS DURING REMOVAL OF EXISTING CONCRETE SHALL BE BURNT BACK AND COATED WITH EPOXY.
   - L. THE CONTRACTOR SHALL VERIFY DIMENSIONS OF THE EXISTING STRUCTURE BEFORE COMMENCING WITH WORK.

7. PRESTRESSED PLANK BEARING SURFACE:
   - A. PRESTRESSED PLANK BEARING SURFACE SHALL BE SMOOTH AND SLOPED TO MATCH THE FINISH ROADWAY SLOPE.
   - B. PRESTRESSED PLANKS SHALL BE SET ON A FRESH LAYER OF MORTAR TO INSURE FULL BEARING.
   - C. PRESTRESSED PLANK SHELF ELEVATIONS SHALL BE DETERMINED BY THE CONTRACTOR. SHELF ELEVATIONS SHALL TAKE INTO CONSIDERATION THE CONCRETE TOPPING THICKNESS, PRESTRESSED PLANK THICKNESS, ROADWAY SLOPE, AND THE CALCULATED, OR IF AVAILABLE, THE ACTUAL CAMBER OF THE PRESTRESSED PLANKS.

8. INSTALLATION OF GUARDRAIL AT EXISTING STRUCTURES:
   - A. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DIMENSIONS OF THE EXISTING STRUCTURE PRIOR TO INSTALLATION OF GUARDRAIL POSTS (GUARDRAIL TYPE "A" AND "B").
   - B. REINFORCING BARS IN THE EXISTING STRUCTURE SHALL NOT BE CUT OR DAMAGED DURING DRILLING OPERATIONS FOR CONCRETE CURB REINFORCING BARS (GUARDRAIL TYPE "C"). THE NEW CONCRETE CURB REINFORCING BARS SHALL BE OFFSET AS REQUIRED TO AVOID THE EXISTING REINFORCING BARS.
   - C. THE CONCRETE CURB REINFORCING BARS SHALL BE PLACED SUCH THAT THEY WILL NOT INTERFERE WITH THE DRILLING AND EPOXY PLACEMENT OF THE GUARDRAIL POST ANCHOR BOLTS (GUARDRAIL TYPE "C").

9. FOUNDATION:
   - A. THESE FOUNDATION NOTES WERE BASED ON RECOMMENDATIONS CONTAINED IN A GEOTECHNICAL ENGINEERING EXPLORATION REPORT BY ERNEST K. HIRATA & ASSOCIATES, INC. DATED JANUARY 24, 2000. THE REPORT SHALL BE CONSIDERED AS PART OF THE CONSTRUCTION DOCUMENTS AND ITS RECOMMENDATIONS SHALL BE IMPLEMENTED UNLESS OTHERWISE DIRECTED BY THE GEOTECHNICAL ENGINEER. THE CONTRACTOR MAY OBTAIN A COPY OF THE REPORT AT THE STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION - HIGHWAYS DIVISION UPON REQUEST.
   - B. SOIL DESIGN PARAMETERS:
     1. HORIZONTAL EARTH PRESSURE:
        - A. FREESTANDING (ACTIVE) = 40 PCF
        - B. RESTRAINED (AT-REST) = 55 PCF
     2. PASSIVE EARTH PRESSURE = 300 PCF (3,000 PSF MAXIMUM)
     3. COEFFICIENT OF FRICTION:
        - A. STRENGTH LIMIT STATE = 0.40
        - B. EXTREME EVENT LIMIT STATE = 0.50
     4. ALLOWABLE SOIL BEARING PRESSURE:
        - A. STRENGTH LIMIT STATE = 4,500 PSF
        - B. EXTREME EVENT LIMIT STATE = 7,500 PSF
     5. DYNAMIC LATERAL EARTH PRESSURE:
        - A. SOIL UNIT WEIGHT = 110 PCF
        - B. FRICTION ANGLE = 28-DEGREES
   - C. STRUCTURAL BACKFILL:
     1. STRUCTURAL BACKFILL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS FOR STRUCTURE BACKFILL MATERIAL A AS INDICATED IN SECTION 703.20 OF THE HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION, 1994 AND THE SPECIAL PROVISIONS.
     2. PLACEMENT OF THE STRUCTURAL BACKFILL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS.

Depressed "V"
Letters 3/8" Deep

3" NAME 1/2" DATE

Use Correct Name Of Bridge — Date Of Year Built

Note:
1. Name And Date Shall Be Placed At The Trailing End Post On Each Side Of The Roadway.
2. Exact Details And Spacing Of Letters 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

Not To Scale

ABBREVIATIONS

ø	DIAMETER	LB., LBS.	POUND, POUNDS
#	NUMBER OR POUND	L.F.	LINEAR FEET
A.B.	ANCHOR BOLT	L.S.	LUMP SUM
A.C.	ASPHALT CONCRETE	MAX.	MAXIMUM
AZ.	AZIMUTH	MIN.	MINIMUM
BOT., BOTT., B	BOTTOM	NO., #	NUMBER
C.J.	CONSTRUCTION JOINT	N.F.	NEAR FACE
℄	CENTERLINE	N.T.S.	NOT TO SCALE
C.G.	CENTER OF GRAVITY	O.C.	ON CENTER
CLR., CL.	CLEAR	PCF	POUNDS PER CUBIC FEET
CONC.	CONCRETE	PL., ℙ	PLATE
CONT.	CONTINUOUS	PSF	POUNDS PER SQUARE FEET
C.Y.	CUBIC YARD	PSI	POUNDS PER SQUARE INCH
DBL.	DOUBLE	PVC.	POLYVINYL CHLORIDE
DET.	DETAIL	R, RAD.	RADIUS
D.I.	DUCTILE IRON	REBAR	REINFORCING BAR
DIA.	DIAMETER	REF.	REFERENCE
DN.	DOWN	REINF.	REINFORCED, REINFORCING, REINFORCEMENT
DWG.	DRAWING	R.O.W.	RIGHT-OF-WAY
E.F.	EACH FACE	SHT.	SHEET
E.J.	EXPANSION JOINT	SL.	SLOPE
ELEV., EL.	ELEVATION	STA.	STATION
E.W.	EACH WAY	STD.	STANDARD
EXP.	EXPANSION	STIRR.	STIRRUP
F.B.	FLAT BAR	SYM., SYMM.	SYMMETRICAL
F.F.	FAR FACE	S.S.	STAINLESS STEEL
G	GIRDER	THK., TH.	THICK
GALV.	GALVANIZED	TYP.	TYPICAL
G.J.	GROOVED JOINT	VERT., V	VERTICAL
HORIZ., H	HORIZONTAL	W/	WITH
IN.	INCH		
JT.	JOINT		
K	KIPS		
KSI	KIPS PER SQUARE INCH		

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL NOTES

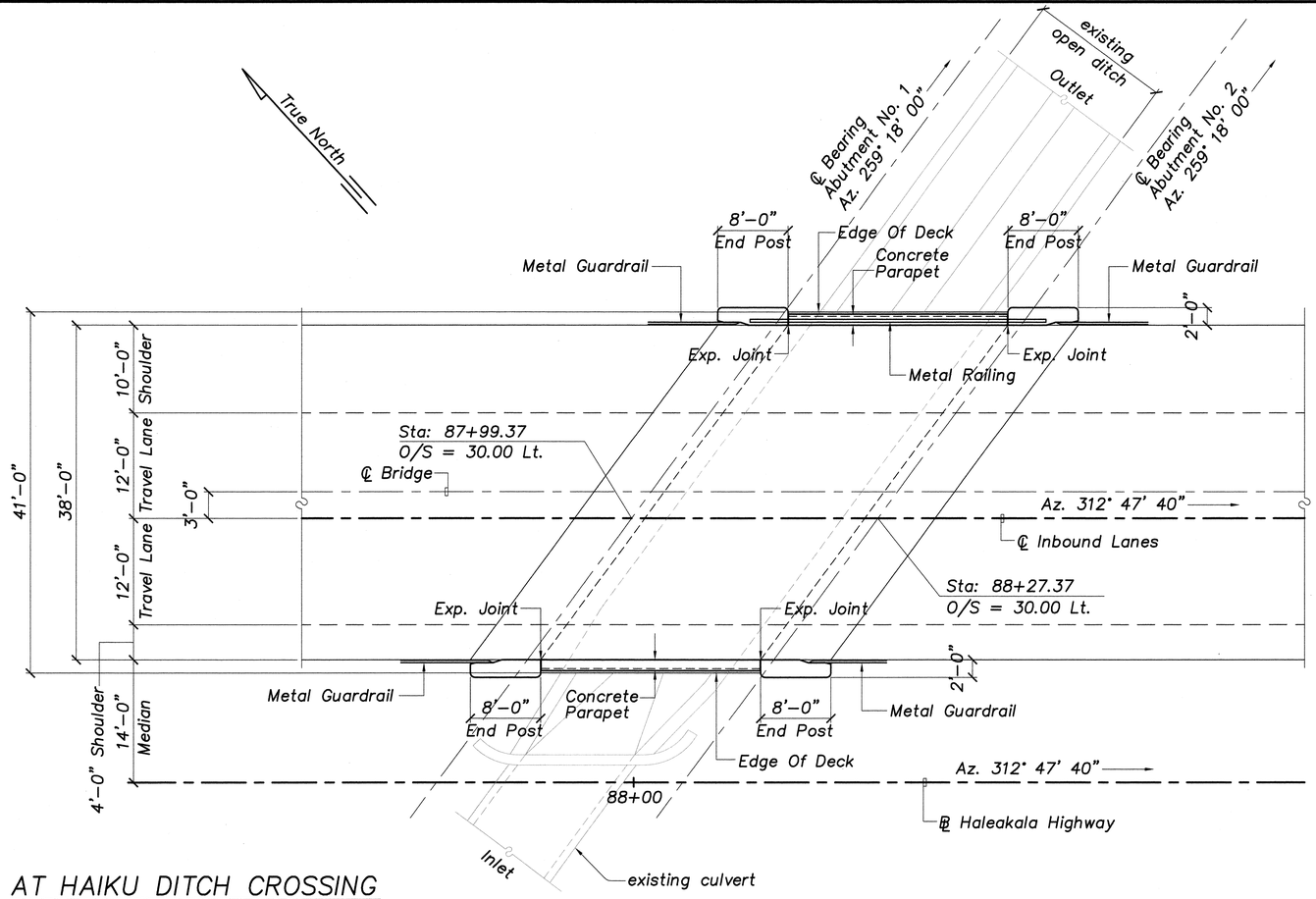
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-2 OF 26 SHEETS

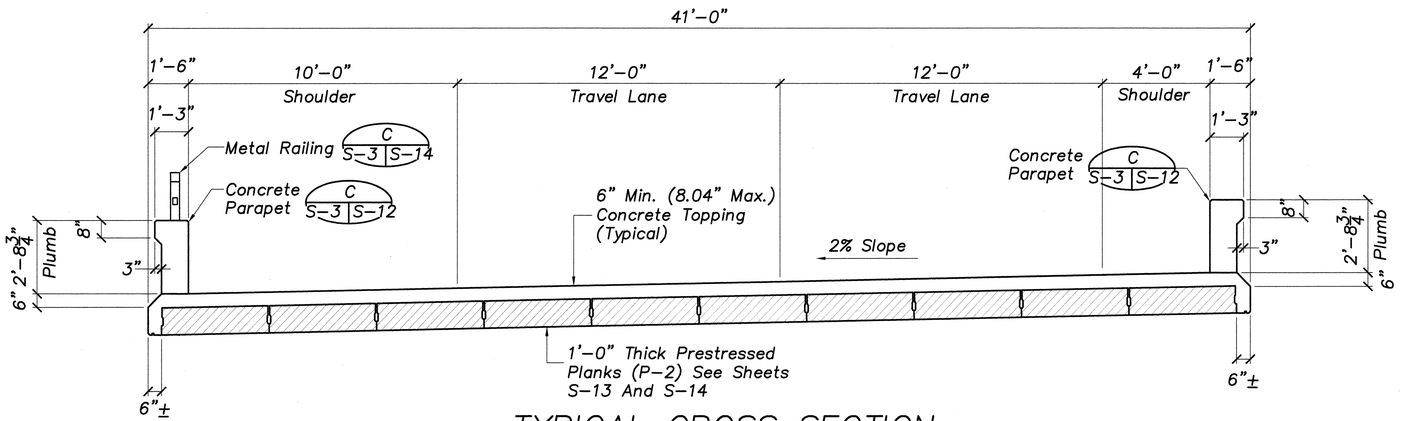
ORIGINAL PLAN
NOTE BOOK
No.
STUDY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	236	288



AT HAIKU DITCH CROSSING
WATERWAY STRUCTURE NO. 1 BRIDGE LAYOUT PLAN

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



TYPICAL CROSS SECTION

Scale: 3/8"=1'-0"

SURVEY PLOTTED BY: DATE
DRAWN BY:
TRACED BY:
DESIGNED BY:
QUANTITIES BY:
CHECKED BY:
ORIGINAL PLAN
NOTE BOOK
No.

GEORGE K. NISHIMURA LICENSED PROFESSIONAL ENGINEER No. 1388-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME/OR UNDER MY SUPERVISION.

SIGNATURE

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EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

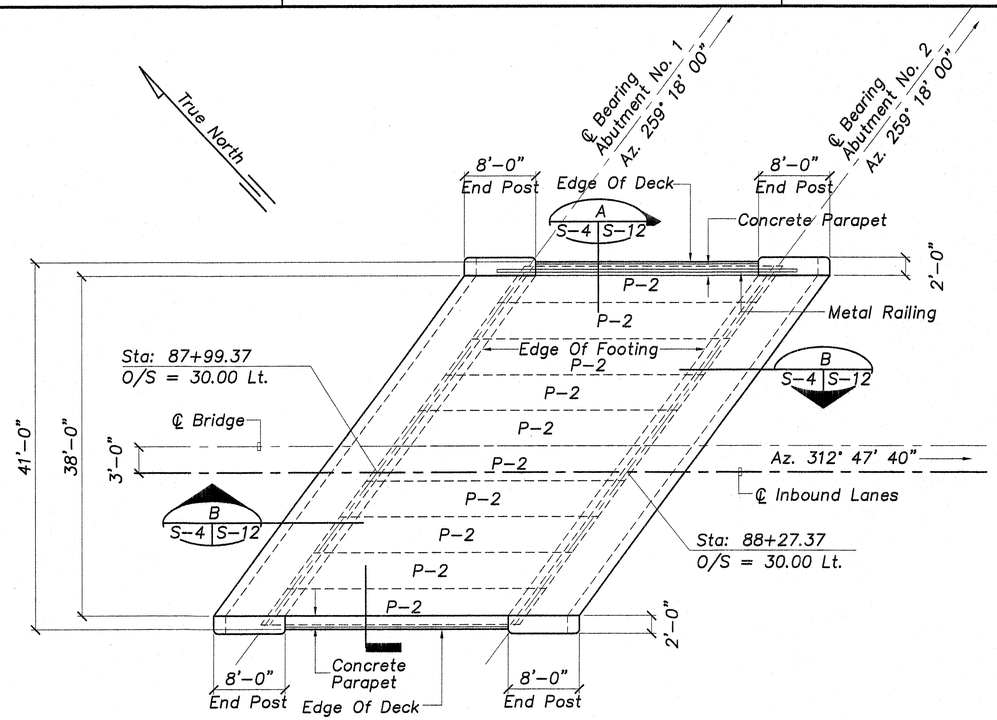
WATERWAY STRUCTURE NO. 1
BRIDGE LAYOUT PLAN, CROSS SECTION

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

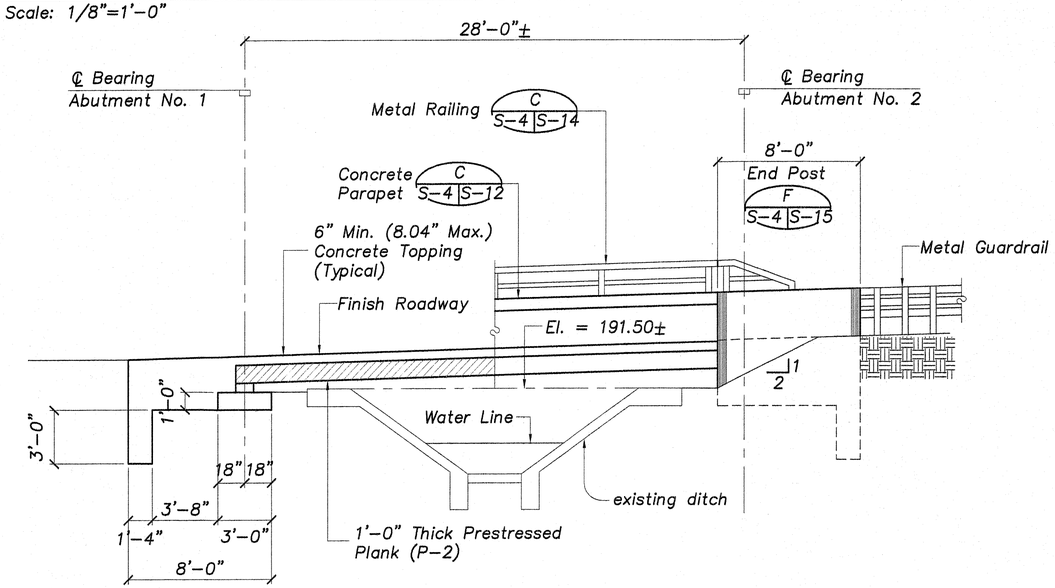
SHEET No. S-3 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	237	288



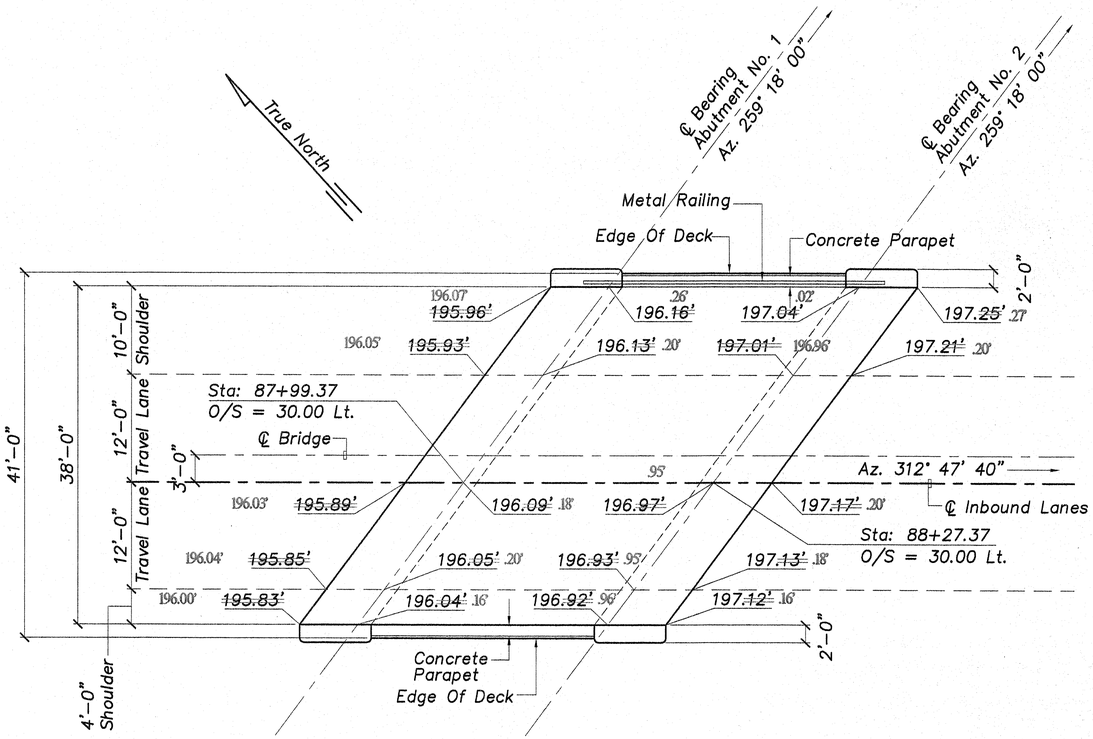
AT HAIKU DITCH CROSSING
WATERWAY STRUCTURE NO. 1 FOUNDATION / FRAMING PLAN

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



TYPICAL LONGITUDINAL SECTION / ELEVATION

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



AT HAIKU DITCH CROSSING
WATERWAY STRUCTURE NO. 1 SLAB ELEVATION PLAN

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

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Roadway	Text for as-built posting

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

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04/30/10
EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATERWAY STRUCTURE NO. 1
FOUNDATION / FRAMING PLAN, SLAB
ELEV. PLAN, LONG. SECTION / ELEVATION

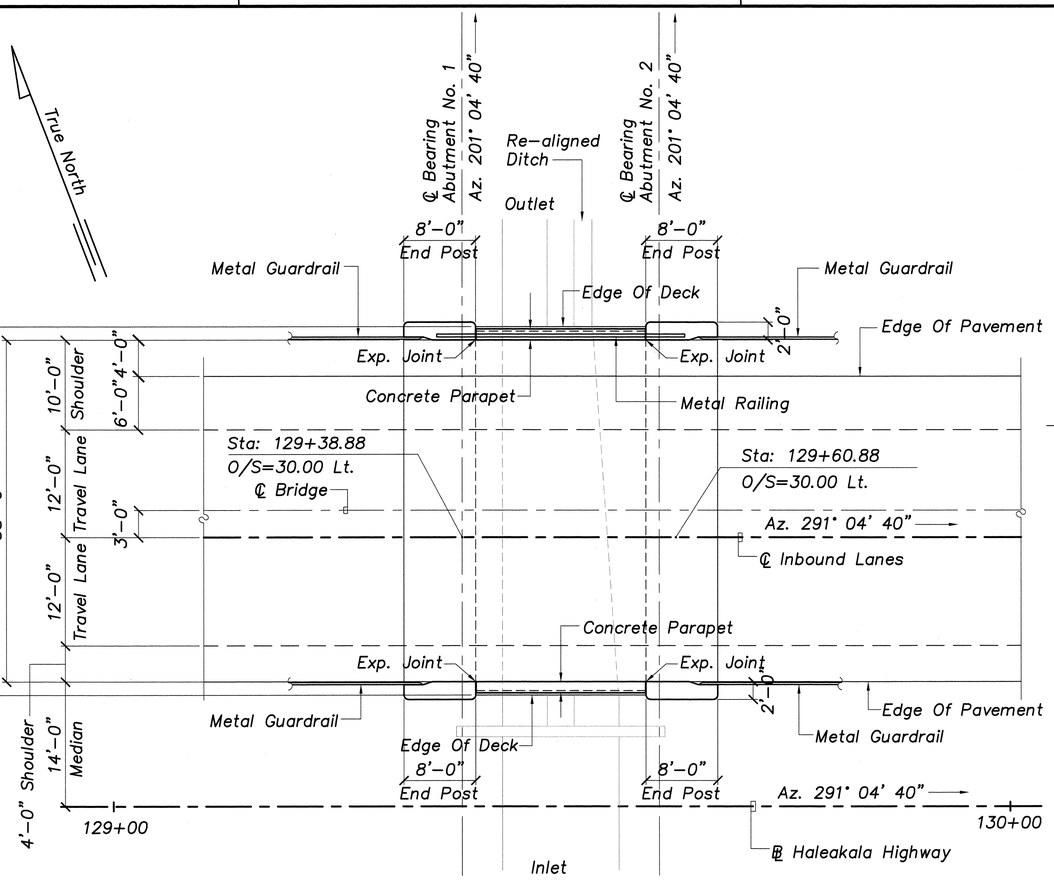
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

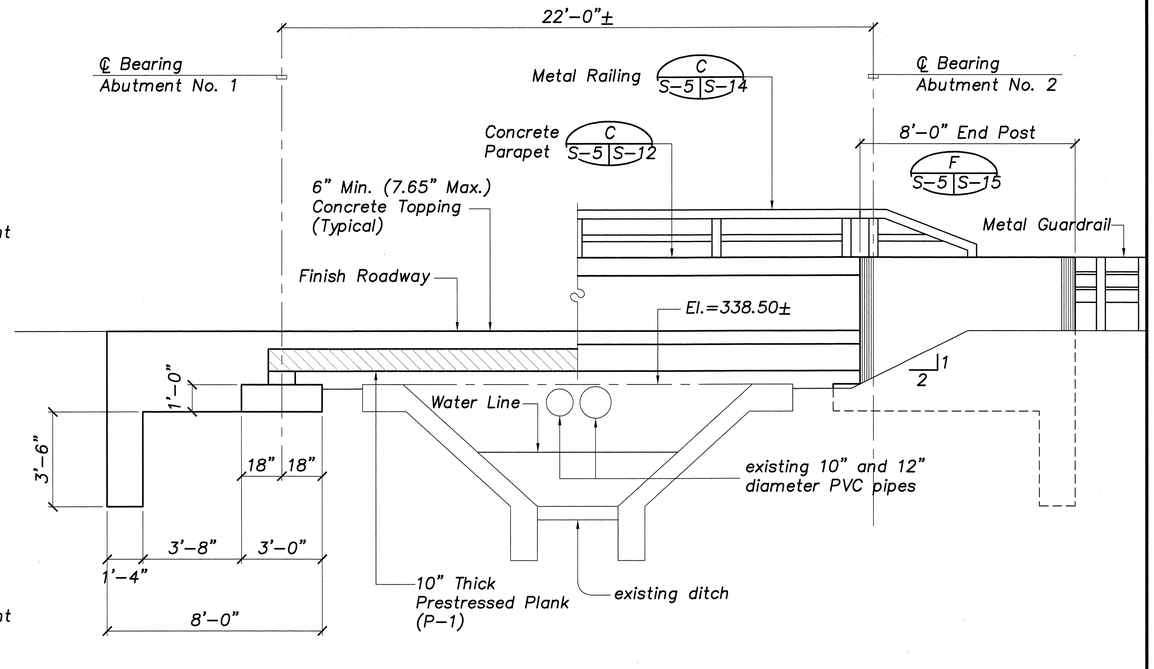
SHEET No. S-4 OF 26 SHEETS

AS-BUILT

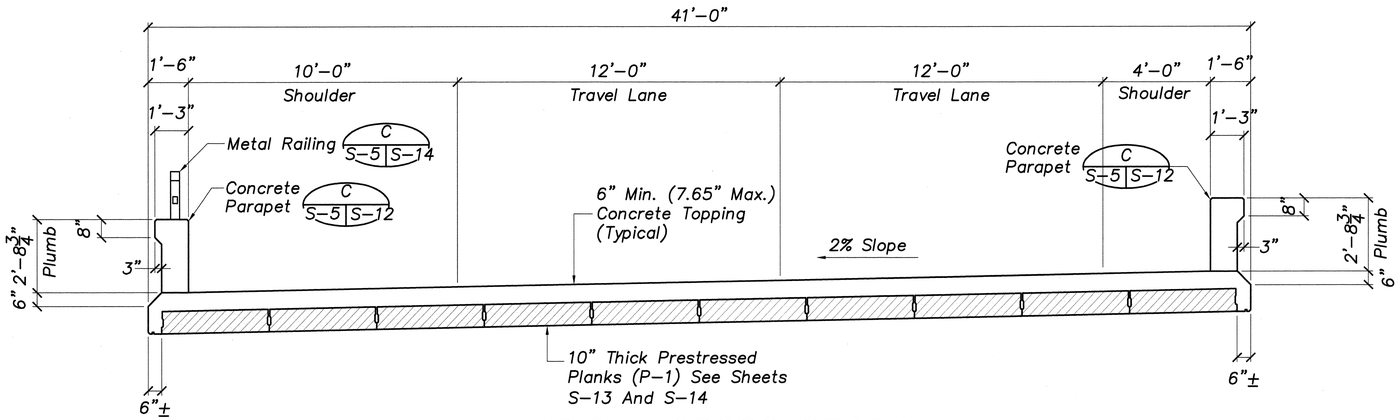
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	238	288



AT BOX CULVERT CROSSING
WATERWAY STRUCTURE NO. 2 LAYOUT PLAN
Scale: 1/8"=1'-0"



TYPICAL LONGITUDINAL SECTION / ELEVATION
Scale: 3/8"=1'-0"



TYPICAL CROSS SECTION
Scale: 3/8"=1'-0"

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

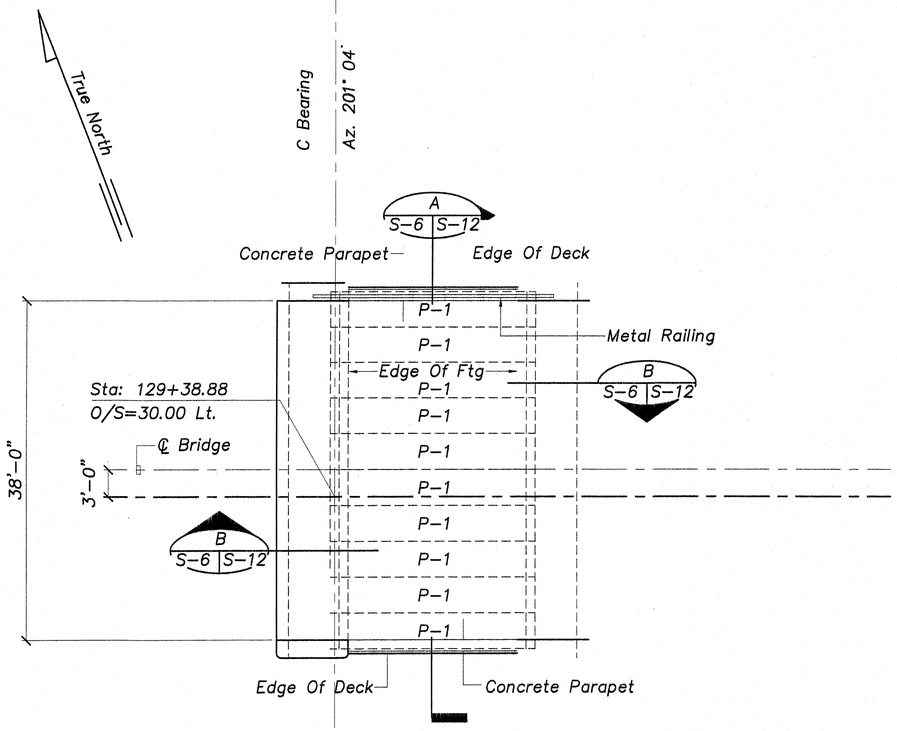
WATERWAY STRUCTURE NO. 2
BRIDGE LAYOUT PLAN, CROSS SECTION, LONGITUDINAL SECTION / ELEVATION

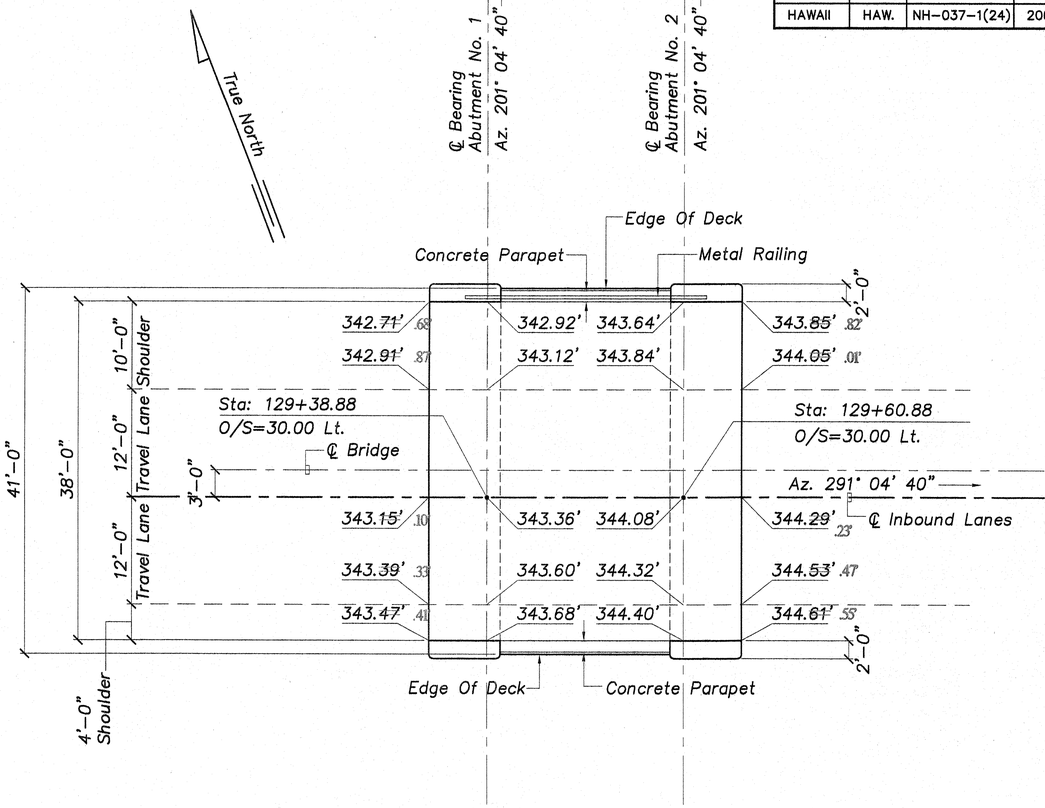
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-5 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	239	288





AT BOX CULVERT CROSSING

WATERWAY STRUCTURE NO. 2 FOUNDATION / FRAMING PLAN

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

AT BOX CULVERT CROSSING

WATERWAY STRUCTURE NO. 2 SLAB ELEVATION PLAN

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
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Roadway	Text for as-built posting

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

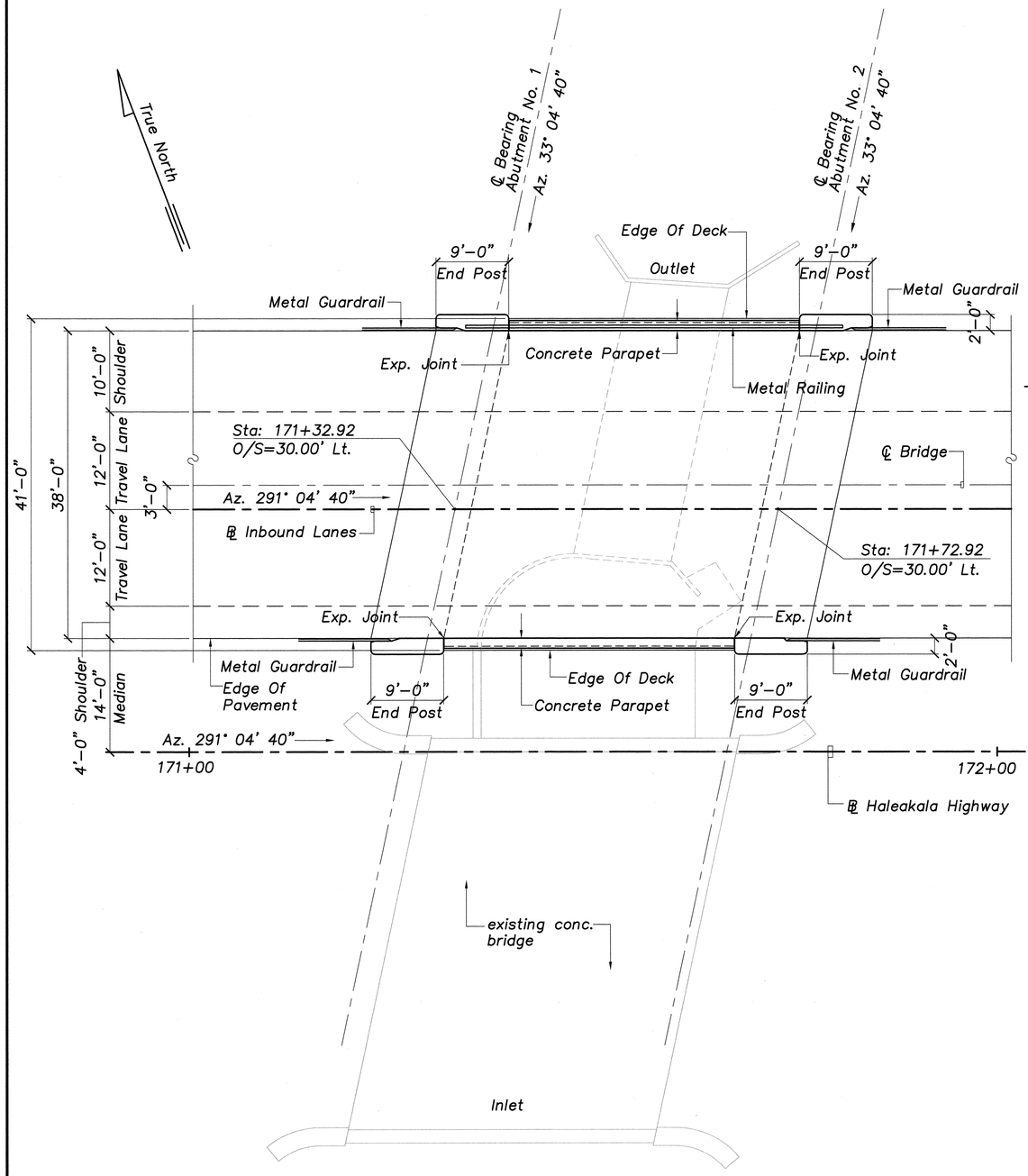
WATERWAY STRUCTURE NO. 2
FOUNDATION / FRAMING PLAN,
SLAB ELEVATION PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-6 OF 26 SHEETS

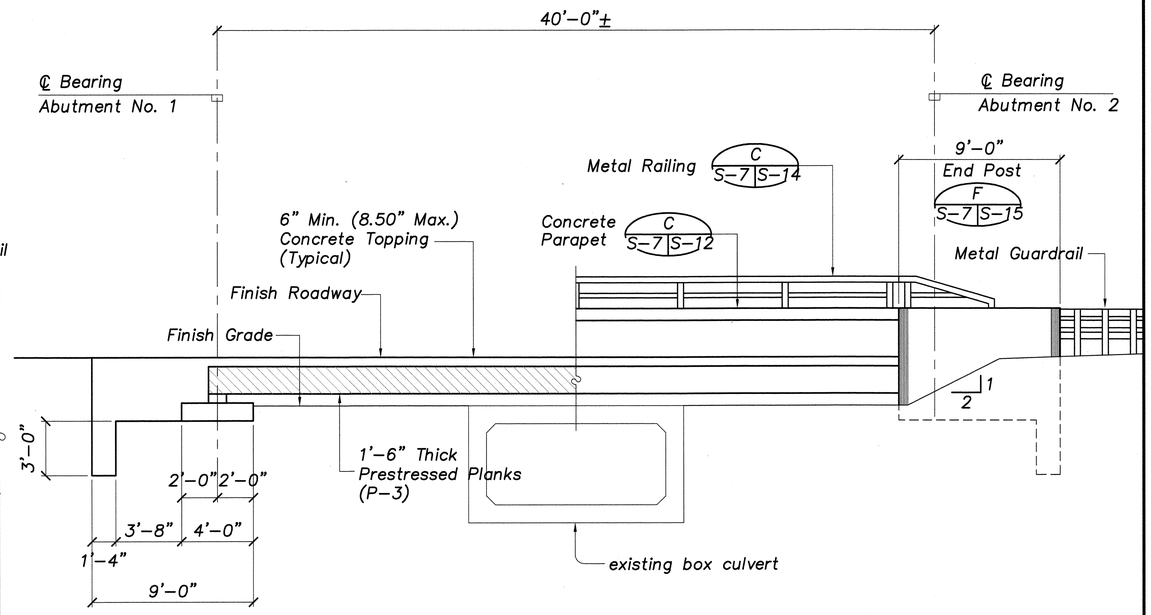
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	240	288



AT LOWRIE DITCH CROSSING

WATERWAY STRUCTURE NO. 3 BRIDGE LAYOUT PLAN

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



TYPICAL LONGITUDINAL SECTION / ELEVATION

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
No.	DESIGNED BY	
	QUANTITIES BY	
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

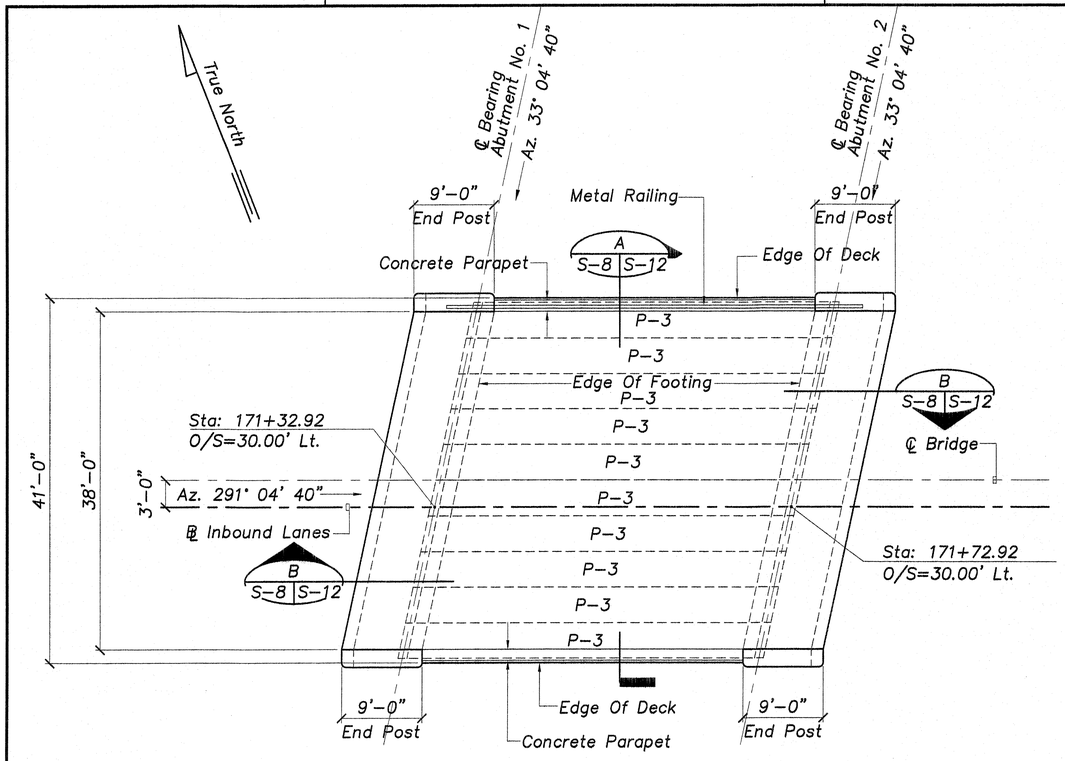
WATERWAY STRUCTURE NO. 3
BRIDGE LAYOUT PLAN, LONGITUDINAL
SECTION / ELEVATION

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

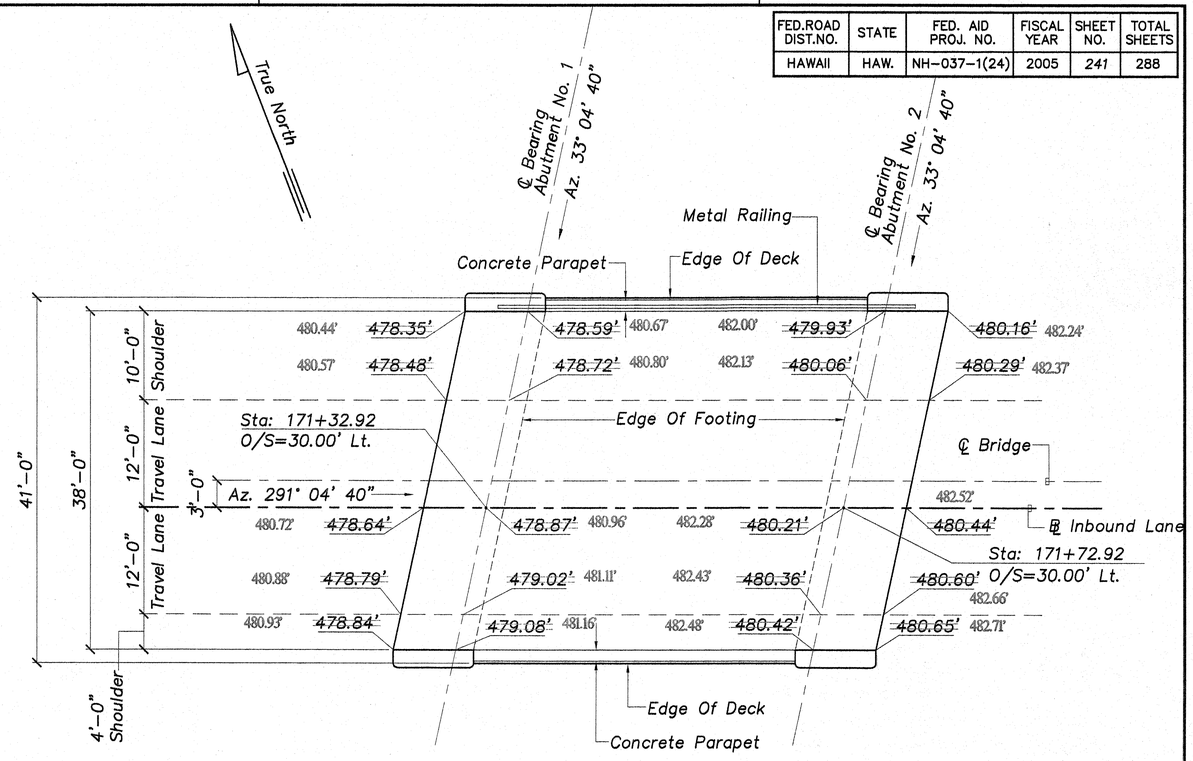
SHEET No. S-7 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	241	288



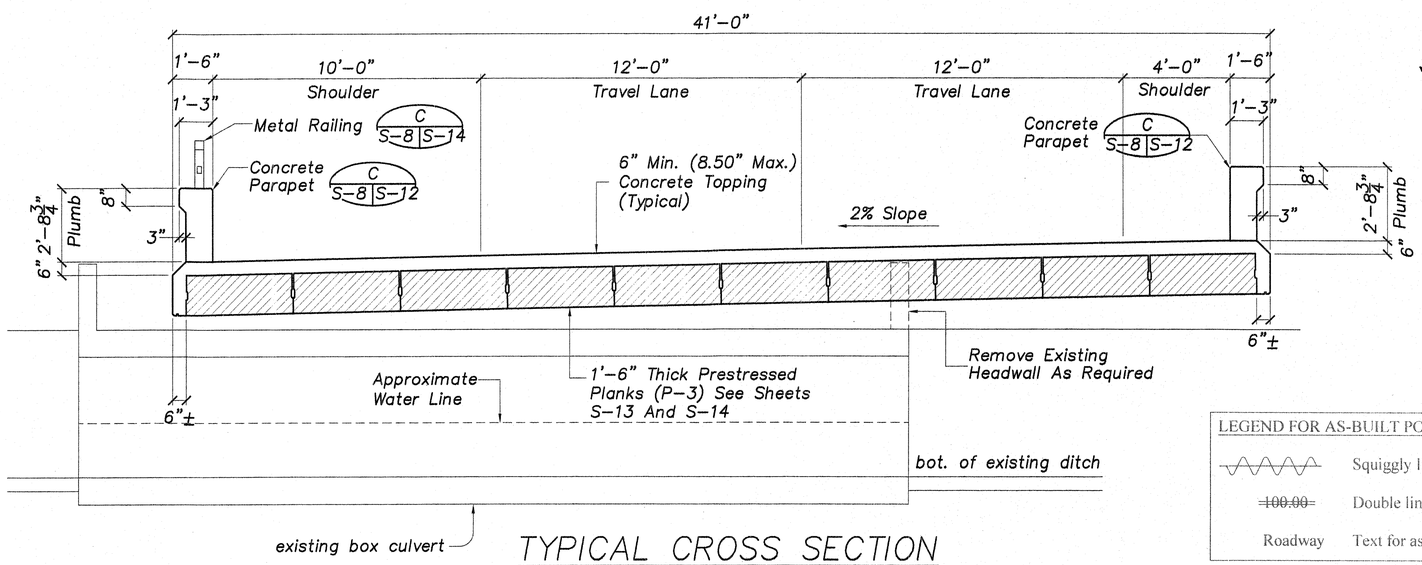
AT LOWRIE DITCH CROSSING
WATERWAY STRUCTURE NO. 3 FOUNDATION / FRAMING PLAN

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



AT LOWRIE DITCH CROSSING
WATERWAY STRUCTURE NO. 3 SLAB ELEVATION PLAN

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



TYPICAL CROSS SECTION

Scale: 3/8"=1'-0"

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EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATERWAY STRUCTURE NO. 3
FOUNDATION / FRAMING PLAN, SLAB ELEV. PLAN, CROSS SECTION

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

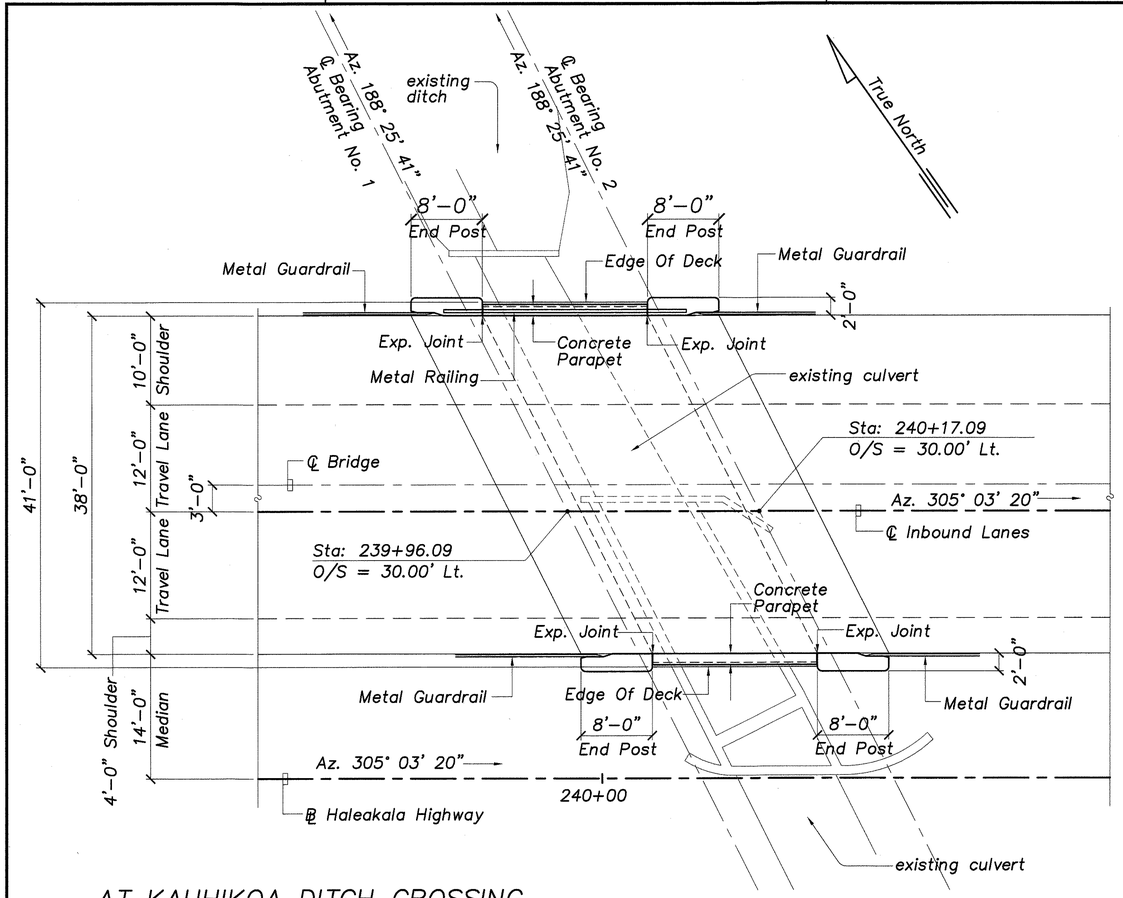
SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-8 OF 26 SHEETS

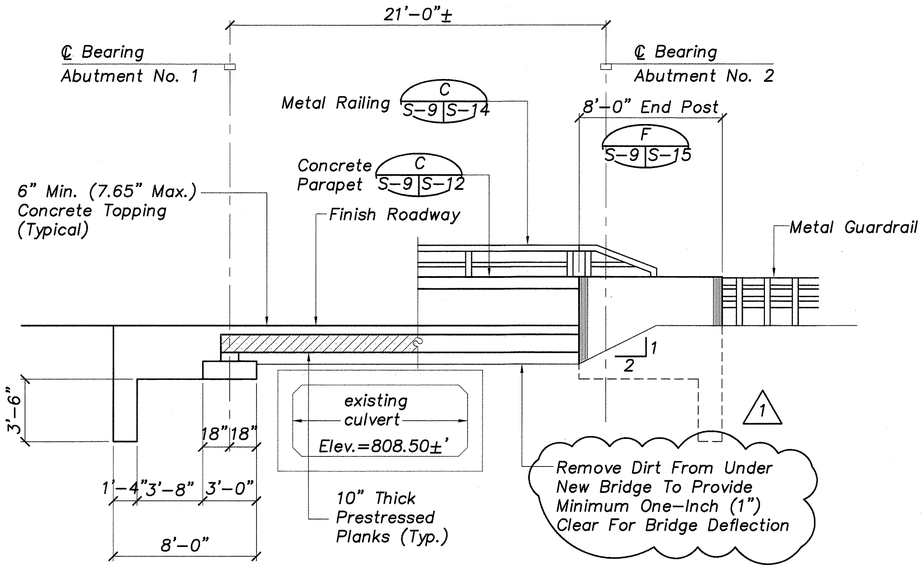
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
ORIGINAL PLAN
NOTE BOOK
No.

AS-BUILT

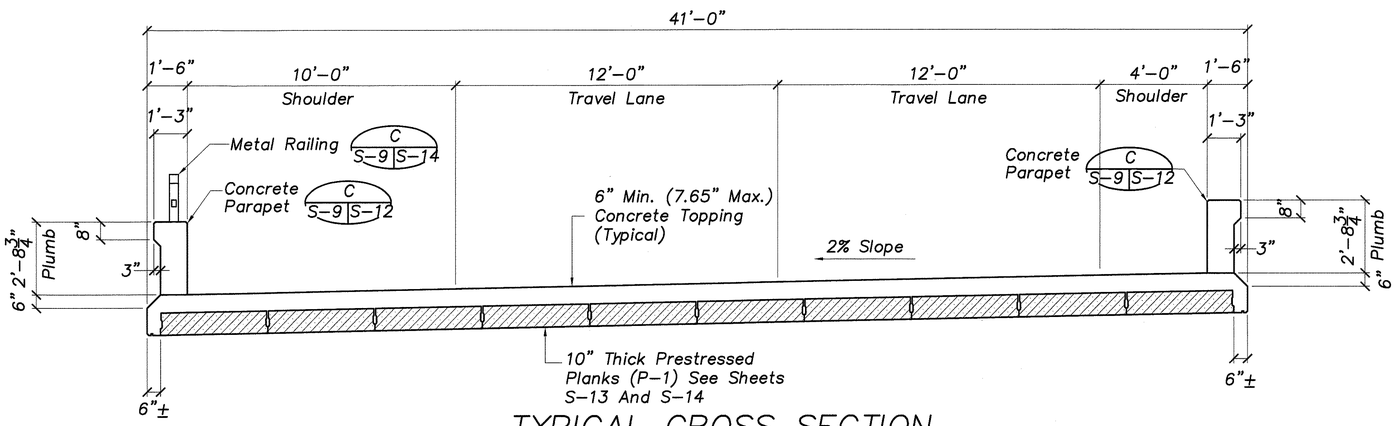
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	C.O. 242	288



AT KAUHIKOA DITCH CROSSING
WATERWAY STRUCTURE NO. 4 BRIDGE LAYOUT PLAN
Scale: 1/8"=1'-0"



TYPICAL LONGITUDINAL SECTION / ELEVATION
Scale: 1/4"=1'-0"



TYPICAL CROSS SECTION
Scale: 3/8"=1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
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No.	QUANTITIES BY	
	CHECKED BY	

3/24/07	1	Added Callout
Date		Revision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATERWAY STRUCTURE NO. 4
BRIDGE LAYOUT PLAN, LONGITUDINAL SECTION / ELEVATION, CROSS SECTION

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

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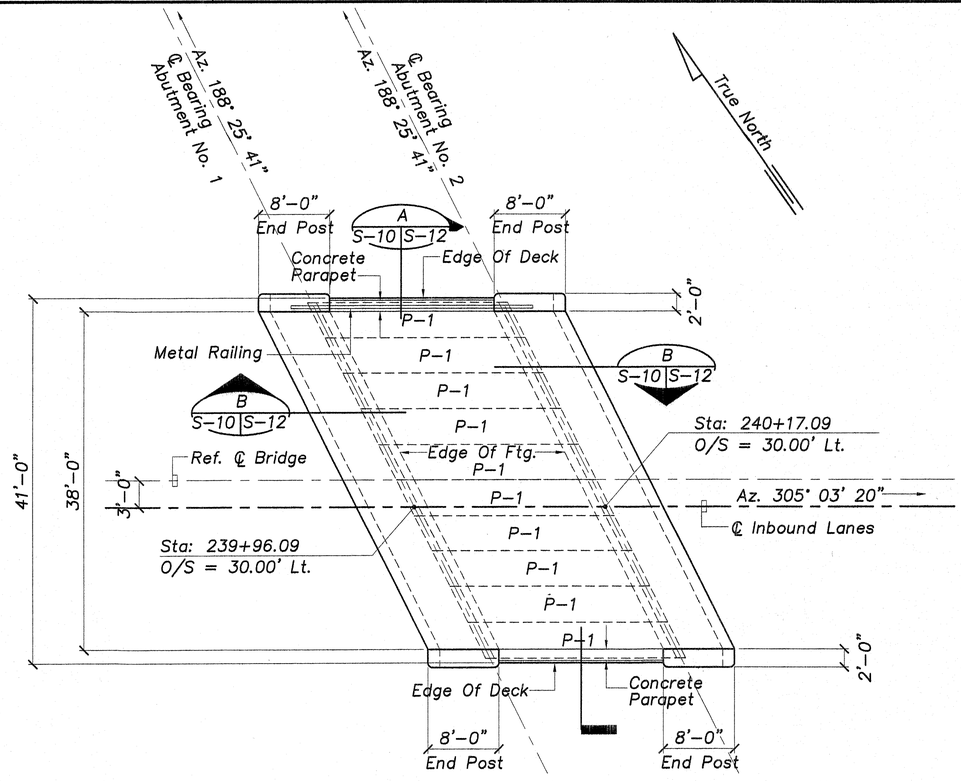
EXPIRATION DATE OF PROFESSIONAL LICENSE

SHEET No. S-9 OF 26 SHEETS

C.O. 242

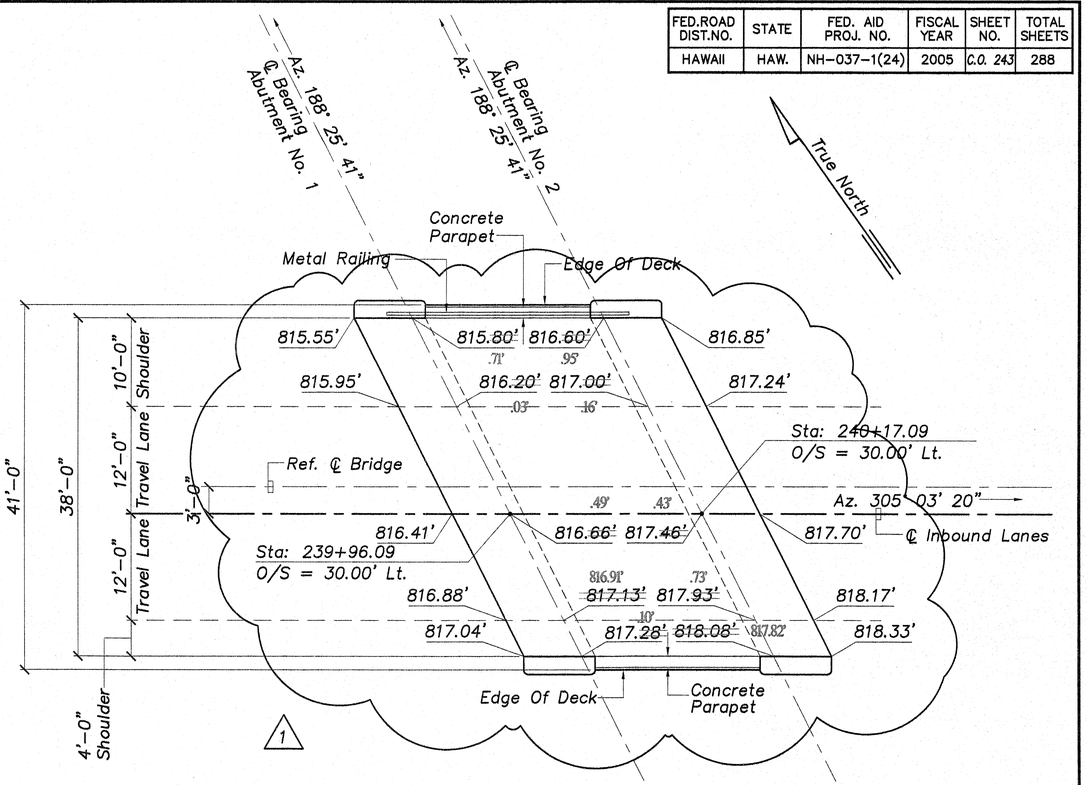
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	C.O. 243	288



AT KAUHIKOA DITCH CROSSING

WATERWAY STRUCTURE NO. 4 FOUNDATION / FRAMING PLAN

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



AT KAUHIKOA DITCH CROSSING

WATERWAY STRUCTURE NO. 4 SLAB ELEVATION PLAN

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
No.	DESIGNED BY	
	QUANTITIES BY	
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Roadway	Text for as-built posting

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No. 1388-S
HAWAII, U.S.A.

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EXPIRATION DATE OF PROFESSIONAL LICENSE

Date	Revision
3/24/07	1 Revised Bridge Deck Finish Grades

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATERWAY STRUCTURE NO. 4
FOUNDATION / FRAMING PLAN,
SLAB ELEVATION PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

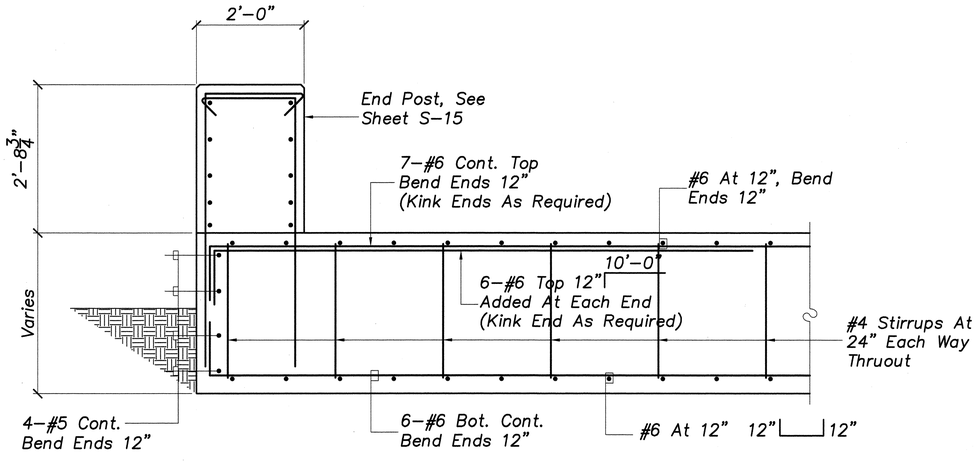
SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-10 OF 26 SHEETS

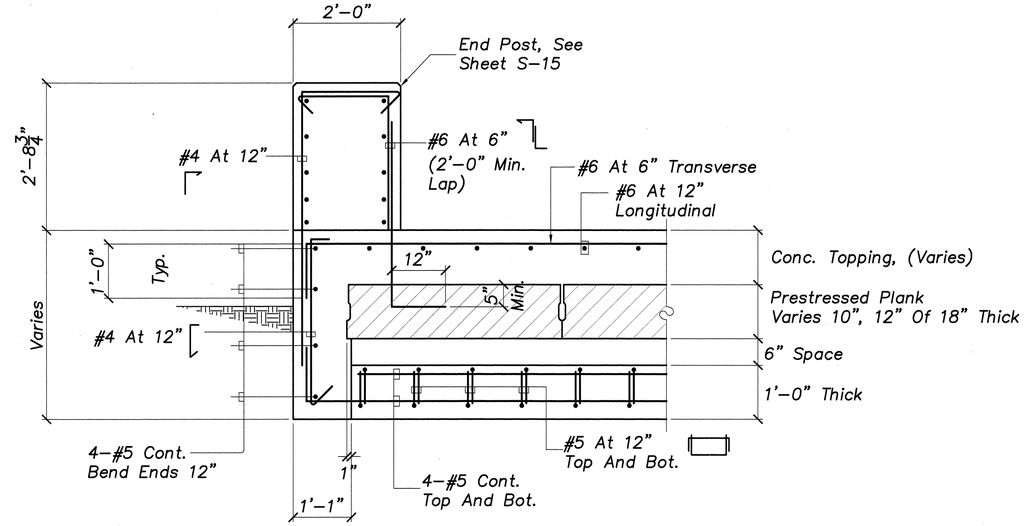
AS-BUILT

C.O. 243

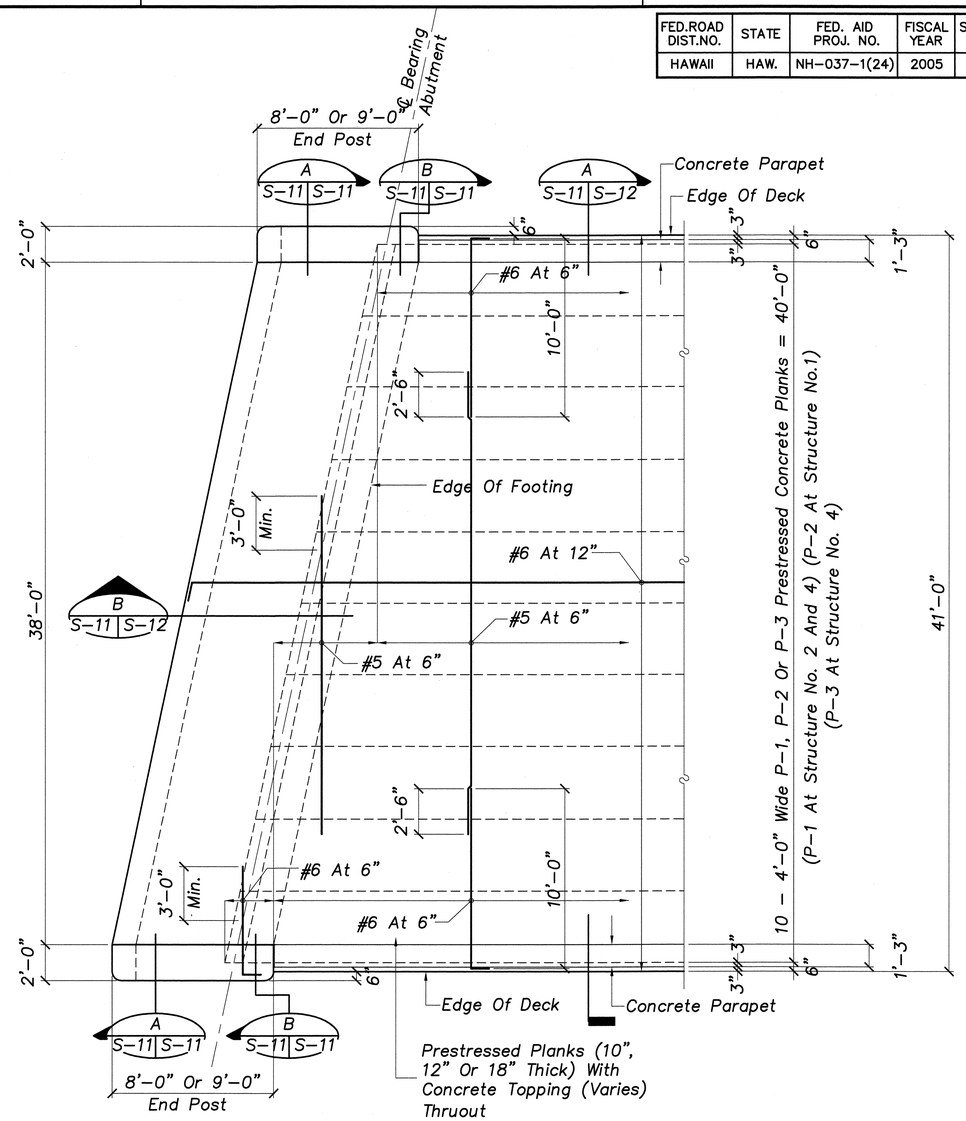
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	244	288



A S-11 S-11 SECTION
Scale: 3/4"=1'-0"



B S-11 S-11 SECTION
Scale: 3/4"=1'-0"



(BRIDGE SYMMETRICAL ABOUT ℄ SPAN)

TYPICAL BRIDGE FOUNDATION / FRAMING PLAN

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

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04/30/06
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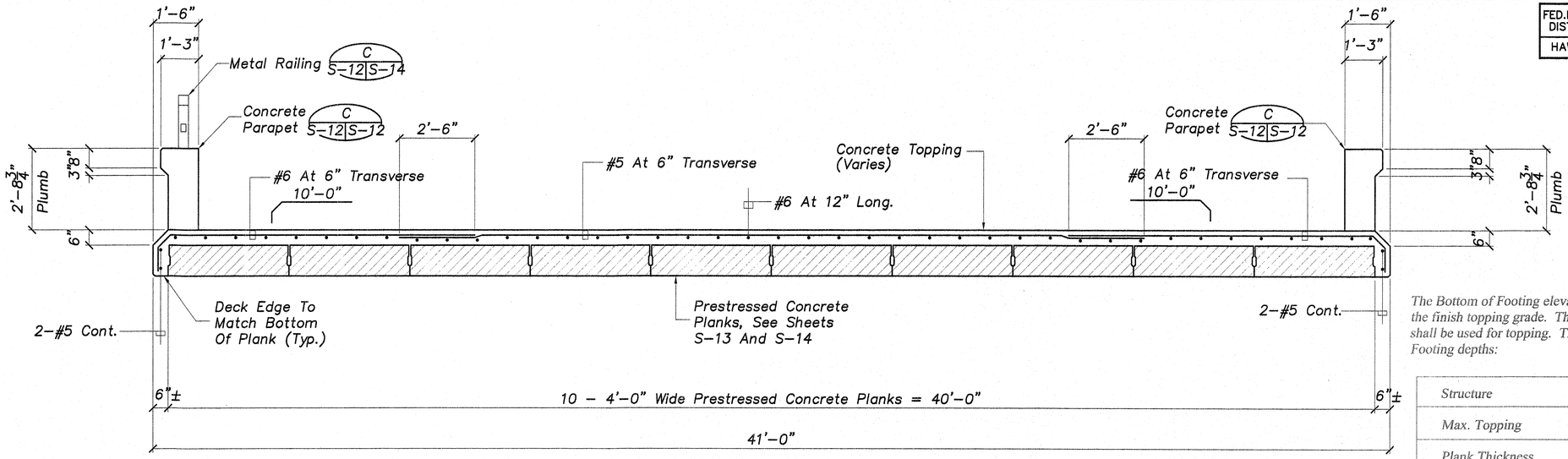
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TYPICAL BRIDGE FOUNDATION / FRAMING PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

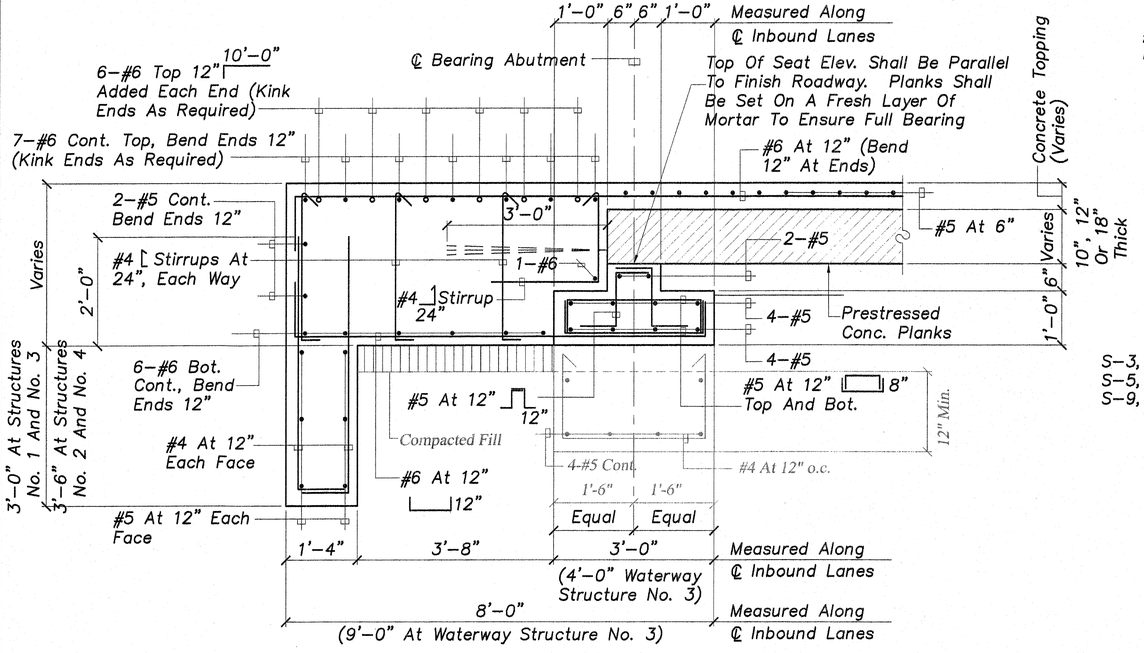
SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-11 OF 26 SHEETS

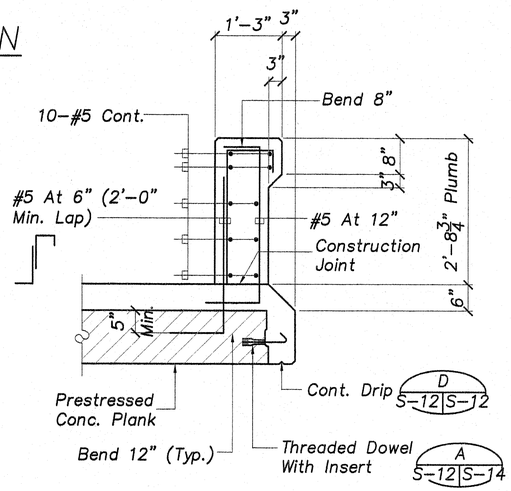
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	245	288



A S-8 S-12 S-4, S-6, S-10, S-11 **TYPICAL CROSS SECTION** Scale: 1/2"=1'-0"



B S-8 S-12 S-4, S-6, S-10, S-11 **TYPICAL ABUTMENT SECTION** Scale: 3/4"=1'-0"

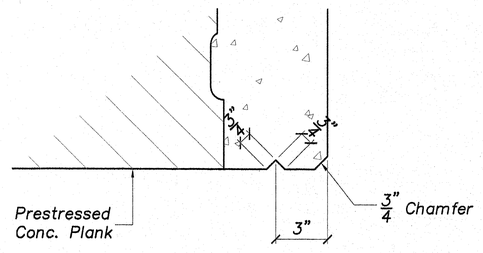


S-3, S-4, S-5, S-7, S-9, S-12 C S-8 S-12 **CONC. PARAPET DETAIL** Scale: 3/4"=1'-0"

The Bottom of Footing elevation shall be determined by calculating down from the finish topping grade. The maximum topping thickness given on the plans shall be used for topping. The following are the Finish Grade to Bottom of Footing depths:

Structure	No. 1	No. 2	No. 3	No. 4
Max. Topping	8.04"	7.65"	8.50"	7.65"
Plank Thickness	12"	10"	18"	10"
Seat Height	6"	6"	6"	6"
Footing Thickness	12"	12"	12"	12"
Depth	38.04" (3.17')	35.65" (2.97')	44.50" (3.71')	35.65" (2.97')

It should be noted that the depth shall be constant and that the Bottom of Footing shall be sloped from edge of deck to edge of deck and from approach edge to centerline bearing.



D S-12 S-12 **CONT. DRIP DETAIL** Scale: 3"=1'-0"

LEGEND FOR AS-BUILT POSTINGS

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FOUNDATION AND FRAMING DETAILS

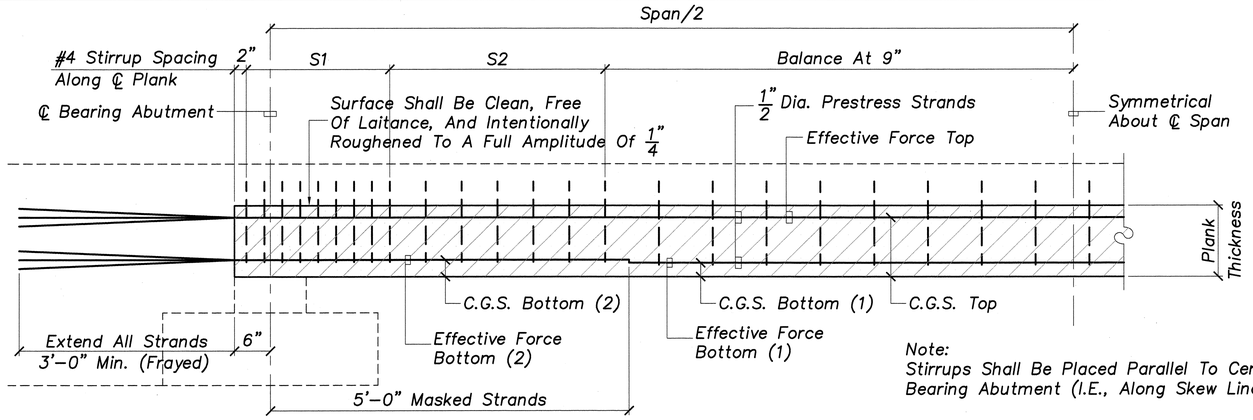
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-12 OF 26 SHEETS

ORIGINAL PLAN | NOTE BOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

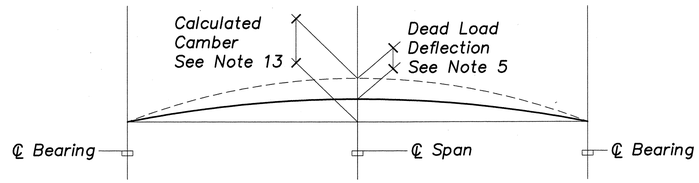
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	246	288



Note:
Stirrups Shall Be Placed Parallel To Centerline Bearing Abutment (I.E., Along Skew Line)

TYPICAL PRESTRESSED PLANK ELEVATION

Not To Scale



PLANK CAMBER DIAGRAM

Not To Scale

PRESTRESSED PLANK TABLE

Plank	Plank Thickness	C.G.S. Bottom (1)	C.G.S. Bottom (2)	C.G.S. Top	Effective Force Bottom (1)	Effective Force Bottom (2)	Effective Force Top	S1	S2	Calculated Camber	Dead Load Deflection	Remarks
P-1	10"	2.42"	———	8.00"	437.0 KIPS	———	92.0 KIPS	8 At 3"	8 At 6"	-0.65"	0.11"	No Masked Strands
P-2	1'-0"	2.80"	2.91"	10.00"	587.5 KIPS	517.0 KIPS	94.0 KIPS	8 At 3"	12 At 6"	-1.04"	0.17"	
P-3	1'-6"	3.50"	3.75"	16.00"	837.0 KIPS	558.0 KIPS	93.0 KIPS	12 At 3"	16 At 6"	-1.50"	0.21"	

PRESTRESSED PLANK NOTES

1. MINIMUM CONCRETE COMPRESSIVE STRENGTH (AT 28 DAYS) OF PRESTRESSED PLANKS SHALL BE AS FOLLOWS:
   A) FINAL CONCRETE STRENGTH = 6,000 PSI
   B) CONCRETE STRENGTH AT TRANSFER = 4,500 PSI
2. PRESTRESSING STRANDS SHALL BE SEVEN WIRE 1/2" DIAMETER LOW RELAXATION STEEL STRANDS (AREA = 0.153 SQ. IN.), WITH AN ULTIMATE STRENGTH OF 270 KSI. FOR PROPERTIES, SEE STANDARD SPECIFICATIONS.
3. NON-PRESTRESSED REINFORCING STEEL SHALL BE GRADE 60, UNLESS OTHERWISE NOTED ON PLANS. FOR PROPERTIES, SEE STANDARD SPECIFICATIONS.
4. EFFECTIVE PRESTRESSING FORCE IS AFTER ALL LOSSES. LOSSES SHALL TAKE INTO CONSIDERATION CREEP, SHRINKAGE, ELASTIC SHORTENING AND RELAXATION OF PRESTRESSING STEEL.
5. DEAD LOAD DEFLECTION IS DUE TO WEIGHT OF THE CONCRETE TOPPING.
6. STRAND PATTERN SHALL BE SYMMETRICAL ABOUT THE CENTERLINE OF THE PRESTRESSED PLANK.
7. STRAND RELEASE SEQUENCE SHALL NOT INDUCE ANY LATERAL DEFLECTION OF THE PRESTRESSED PLANK.
8. THE CONTRACTOR SHALL SUBMIT HIS PROPOSED STRAND PATTERN AND RELEASING SEQUENCE TO THE ENGINEER FOR REVIEW.
9. DURING CURING, CARE SHALL BE TAKEN TO AVOID ANY LATERAL DEFLECTION OF THE PRESTRESSED PLANK DUE TO IMPROPER ORIENTATION.
10. LIFTING DEVICES SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE CENTERLINE BEARING OF THE PRESTRESSED PLANK. DETAILS AND LOCATIONS OF LIFTING DEVICES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. SUCH REVIEW DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES IF THE PRESTRESSED PLANK IS DAMAGED DUE TO FAILURE OF THE LIFTING DEVICES.
11. ELASTIC SHORTENING SHALL BE INCLUDED IN DETERMINING THE LENGTH OF THE PRESTRESSED PLANKS.
12. THE CONTRACTOR SHALL INCORPORATE ALL INSERTS, DOWELS AND OTHER EMBEDDED ITEMS REQUIRED IN THE PRESTRESSED PLANKS DURING FABRICATION.
13. THE CALCULATED CAMBER INCLUDES THE EFFECTS OF THE INITIAL PRESTRESS FORCE AND THE WEIGHT OF THE PRESTRESSED PLANK AT THE TIME OF PLACEMENT. NEGATIVE VALUES INDICATE A NET UPWARD DEFLECTION. THE ACTUAL CAMBER SHALL NOT EXCEED THE CALCULATED CAMBER BY MORE THAN 1-INCH. PRESTRESSED PLANKS EXCEEDING THE CALCULATED CAMBER BY MORE THAN 1-INCH WILL BE REJECTED.
14. A CORROSION INHIBITING ADMIXTURE SHALL BE INCLUDED IN THE CONCRETE MIX FOR THE PRESTRESSED PLANKS. THE CORROSION INHIBITING ADMIXTURE SHALL CONTAIN A MINIMUM OF 30% CALCIUM NITRITE BY MASS AND SHALL BE ADDED AT A DOSAGE RATE OF 4.0 GALLONS PER CUBIC YARD OF CONCRETE. THE ADMIXTURE SHALL BE RHEOCRETE CNI CALCIUM NITRITE-BASED CORROSION INHIBITOR, DCI S CORROSION INHIBITOR, OR AN APPROVED EQUAL. ADDITION OF CORROSION INHIBITING ADMIXTURE SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

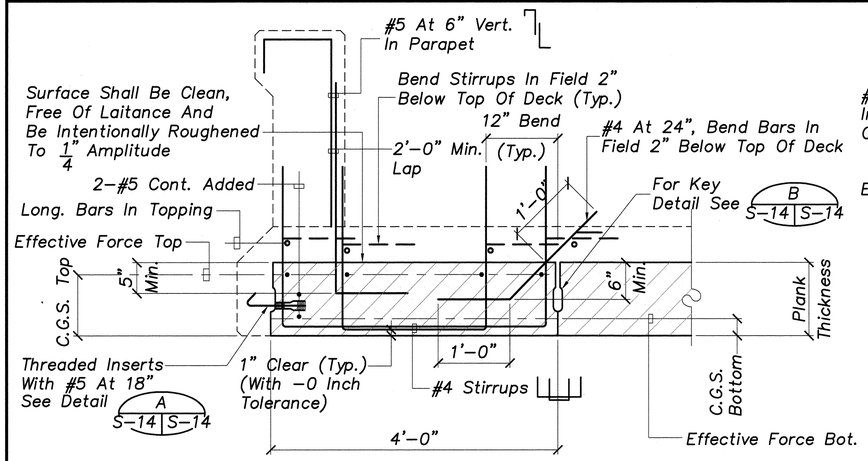
PRESTRESSED PLANK DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-13 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	247	288

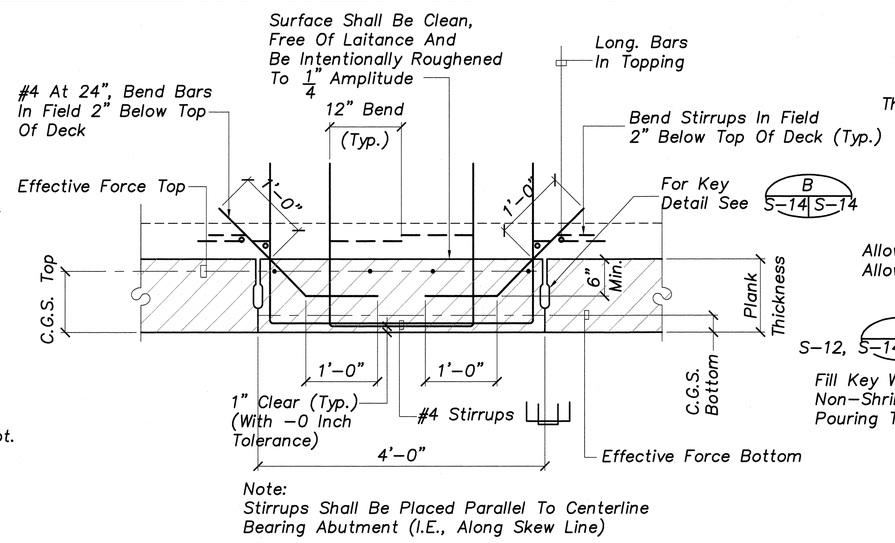


Note:
Stirrups Shall Be Placed Parallel To Centerline Bearing Abutment (I.E., Along Skew Line)

(At Concrete Parapet)

EXTERIOR PLANK SECTION

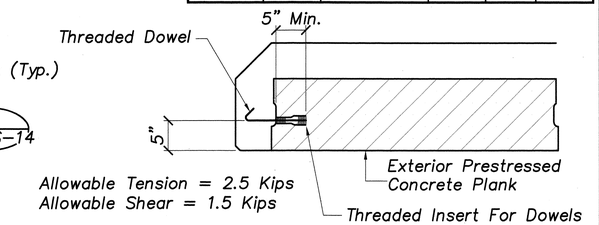
Scale: 1"=1'-0"



Note:
Stirrups Shall Be Placed Parallel To Centerline Bearing Abutment (I.E., Along Skew Line)

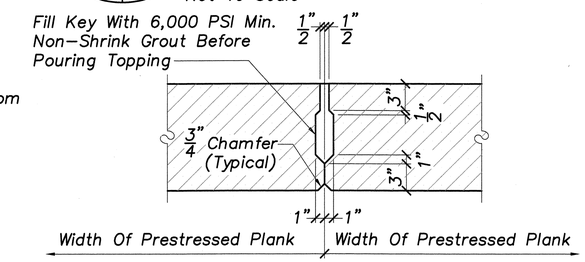
INTERIOR PLANK SECTION

Scale: 1"=1'-0"



THREADED INSERT DETAIL

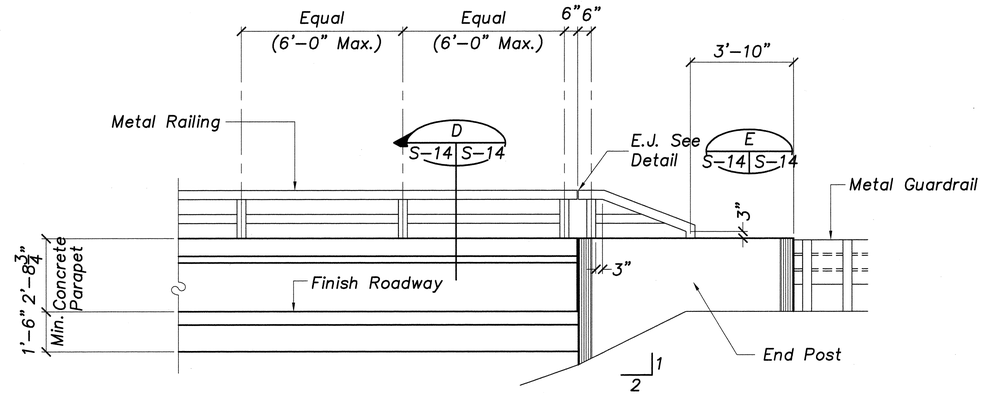
A S-14 | S-14 S-12, Not To Scale



Note:
Non-Shrink Grout Shall Be Incidental To Concrete.

KEY DETAIL

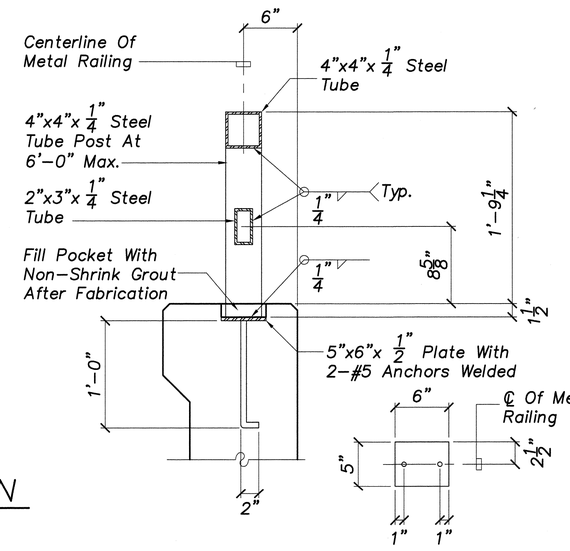
B S-14 | S-14 Scale: 1 1/2" =1'-0"

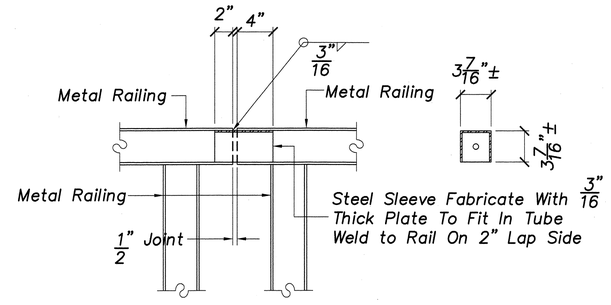


TYPICAL PARAPET AND METAL RAILING ELEVATION

C S-12 | S-14 Scale: 3/8"=1'-0"

S-3, S-4, S-5
S-7, S-8, S-9





METAL RAILING EXPANSION JOINT DETAIL

E S-14, S-21 | S-14 Scale: 1 1/2"=1'-0"

Note:
1. Grind All Exposed Welded Joints On Metal Railing Smooth.
2. Metal Railing Assembly Shall Be Hot Dipped Galvanized After Fabrication.
3. Reinforcing Bars To Be Welded Shall Conform To ASTM A706, Grade 60.

METAL RAILING DETAIL

D S-14 | S-14 Scale: 1 1/2"=1'-0"

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

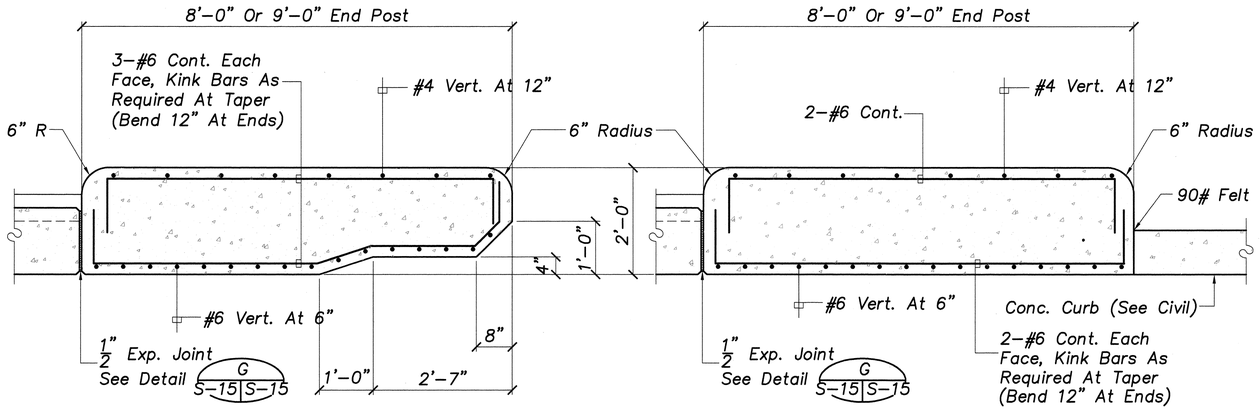
PRESTRESSED PLANK DETAILS
METAL RAILING DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

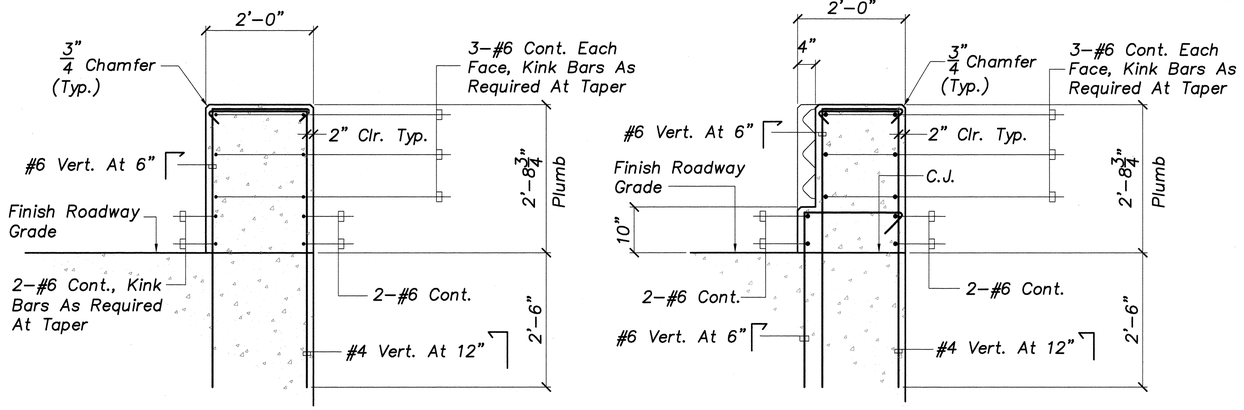
SHEET No. S-14 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	248	288



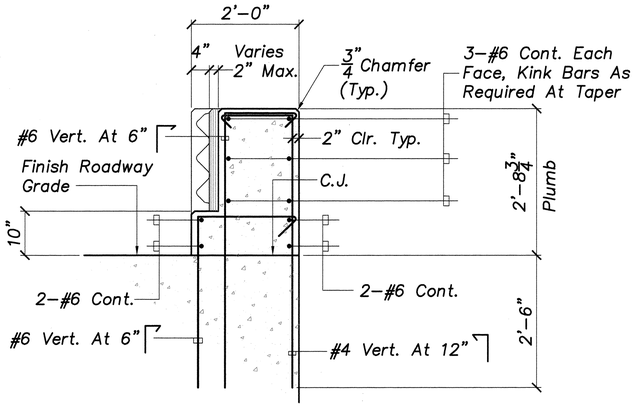
A S-15 S-15 SECTION Scale: 3/4"=1'-0"

B S-15 S-15 SECTION Scale: 3/4"=1'-0"

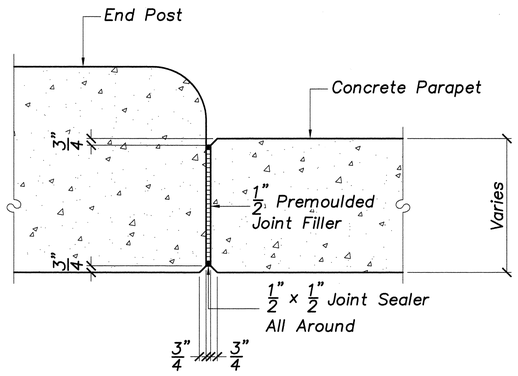


C S-15 S-15 SECTION Scale: 3/4"=1'-0"

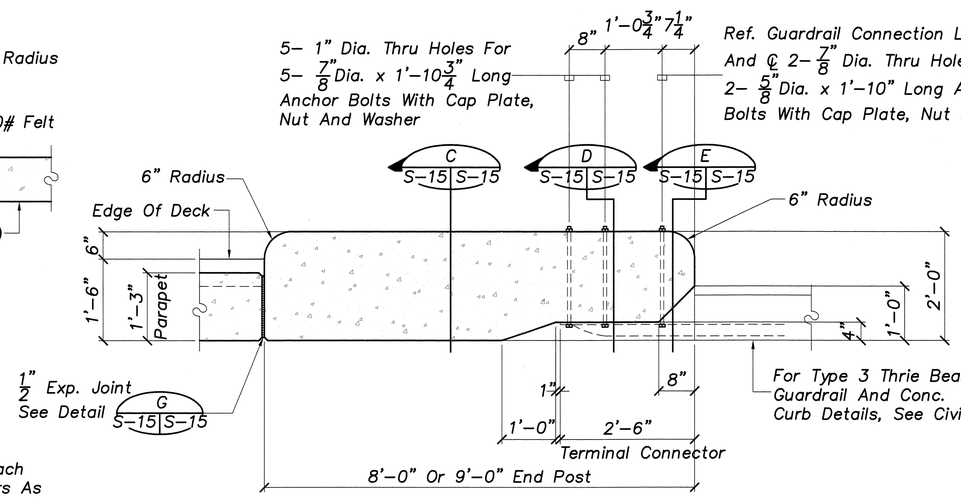
D S-15 S-15 SECTION Scale: 3/4"=1'-0"



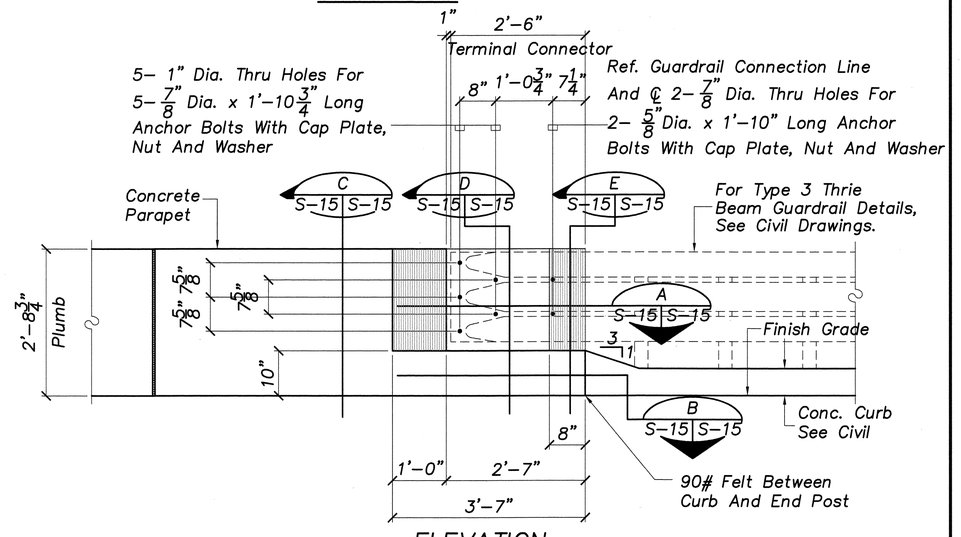
E S-15 S-15 SECTION Scale: 3/4"=1'-0"



G S-15 S-15 EXP. JOINT AT CONC. PARAPET Not To Scale



PLAN VIEW



ELEVATION

F S-5 S-15 S-4, S-7, S-9 PARAPET TO GUARDRAIL CONNECTION DETAIL Scale: 3/4"=1'-0"

ORIGINAL PLAN | SURVEY PLOTTED BY ____ DATE ____ | DRAWN BY ____ | TRACED BY ____ | DESIGNED BY ____ | QUANTITIES BY ____ | CHECKED BY ____ | NOTE BOOK ____ No. ____

GEORGE K. NISHIMURA LICENSED PROFESSIONAL ENGINEER No. 1388-S HAWAII, U.S.A.

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SIGNATURE

04/30/06

EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

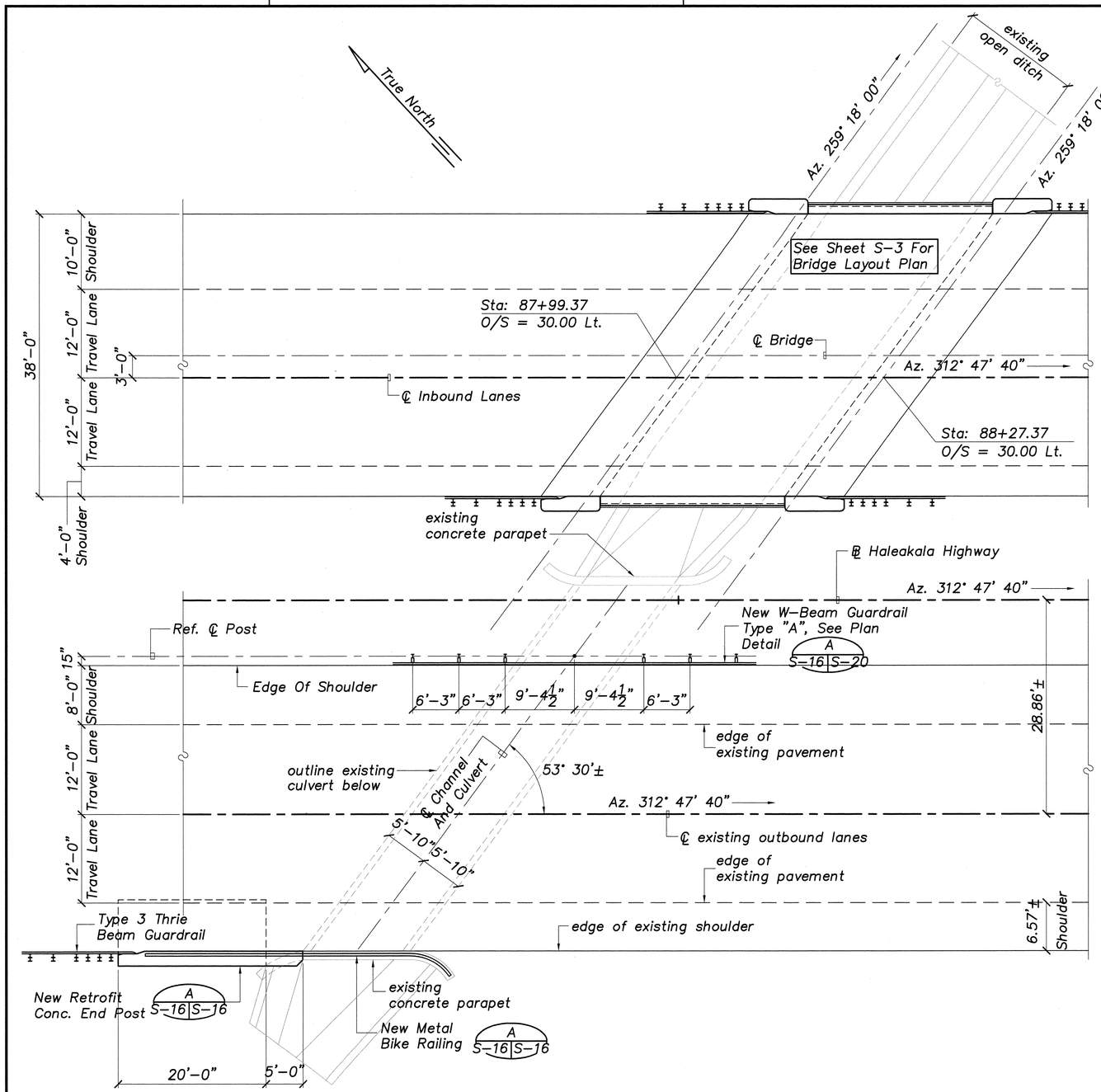
END POST DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

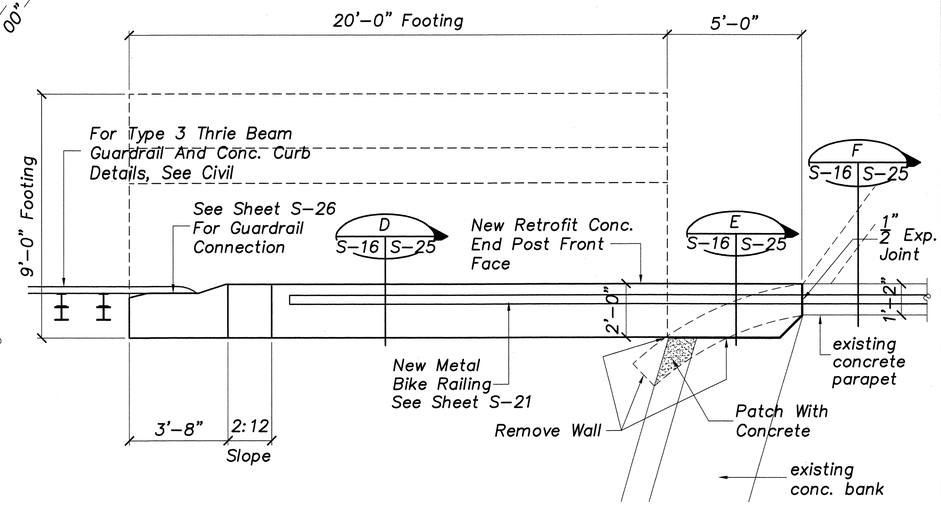
SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-15 OF 26 SHEETS

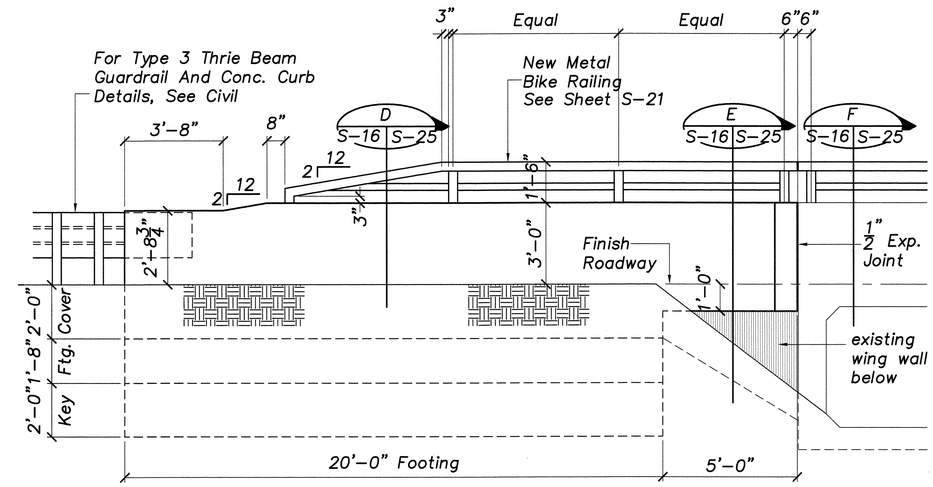
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	249	288



AT HAIKU DITCH CROSSING
EXISTING WATERWAY STRUCTURE NO. 1 LAYOUT PLAN
Scale: 1/8"=1'-0"



CONCRETE END POST PLAN
A S-16 S-16
Scale: 3/8"=1'-0"



CONCRETE END POST ELEVATION
Scale: 3/8"=1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
No.	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

GEORGE K. NISHIMURA LICENSED PROFESSIONAL ENGINEER No. 1388-S HAWAII, U.S.A.

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EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

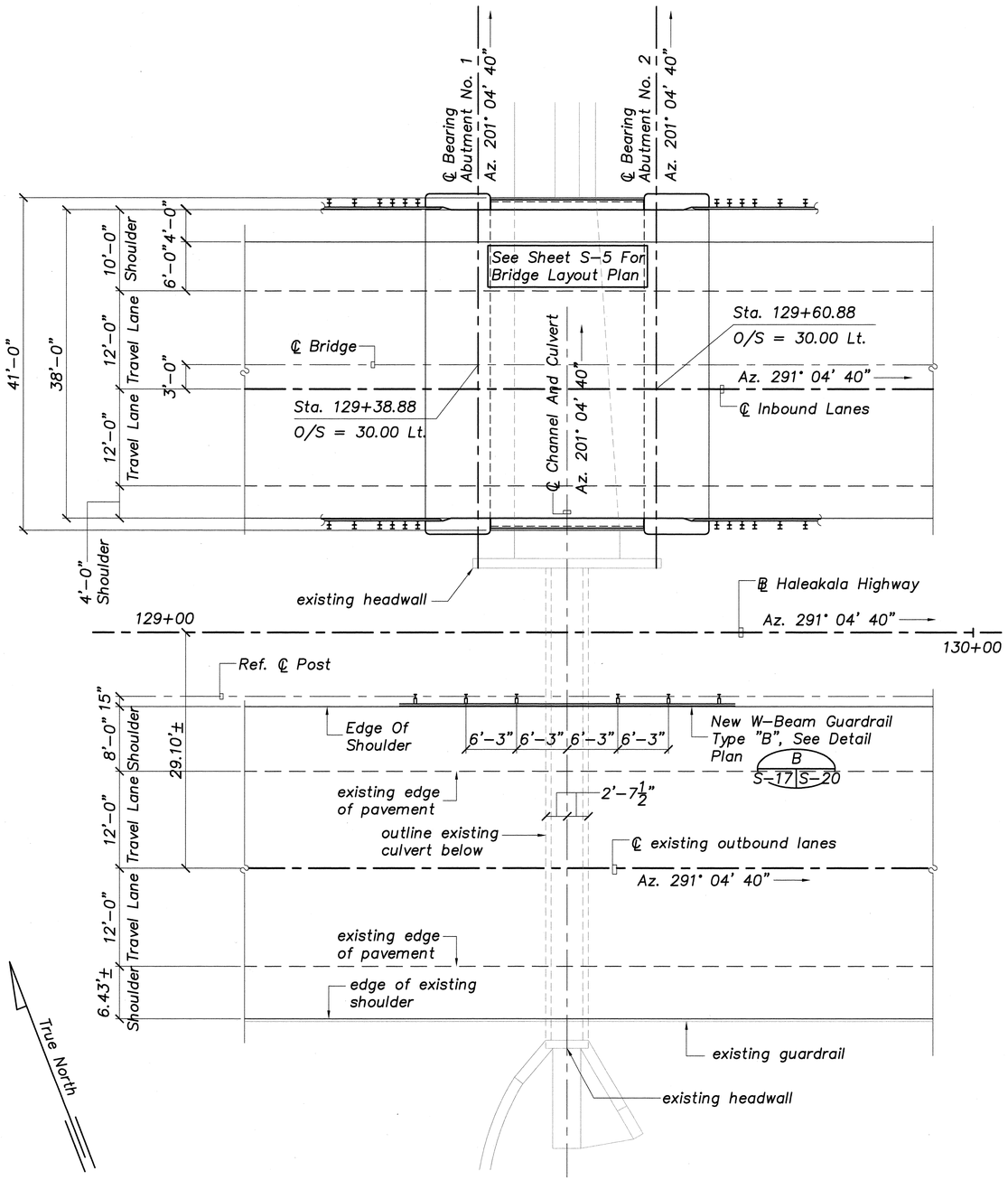
EXISTING WATERWAY STRUCTURE NO. 1
LAYOUT PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-16 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	250	288



AT BOX CULVERT CROSSING

EXISTING WATERWAY STRUCTURE NO. 2 LAYOUT PLAN

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

SURVEY PLOTTED BY
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TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
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NOTE BOOK
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LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

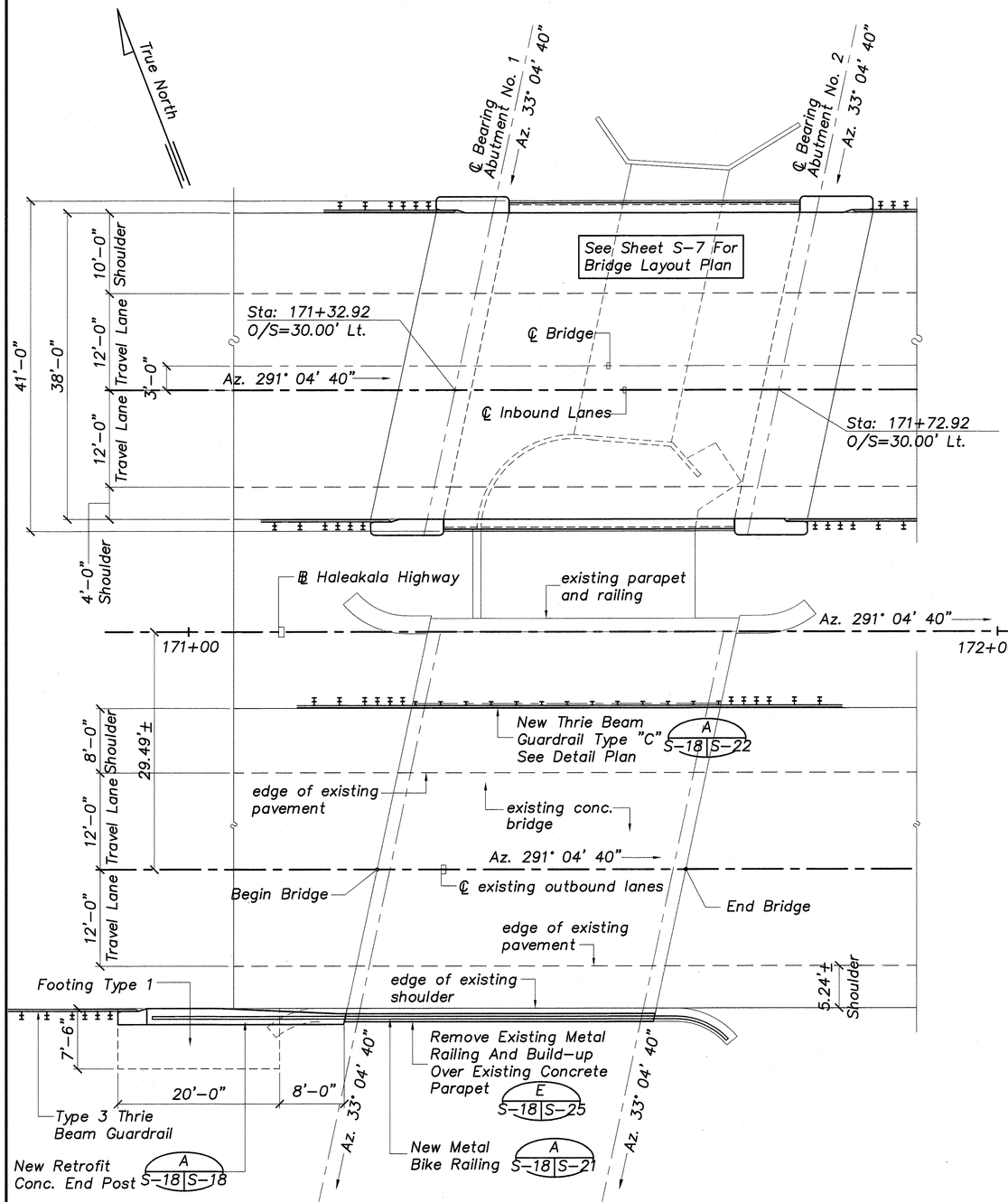
EXISTING WATERWAY STRUCTURE NO. 2
LAYOUT PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

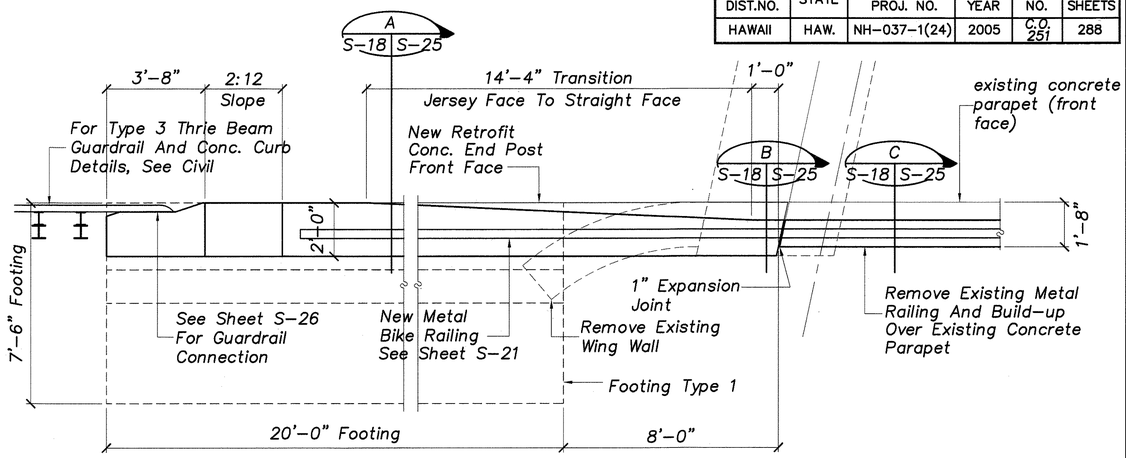
SHEET No. S-17 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	C.O. 251	288



AT LOWRIE DITCH CROSSING
EXISTING WATERWAY STRUCTURE NO. 3 LAYOUT PLAN

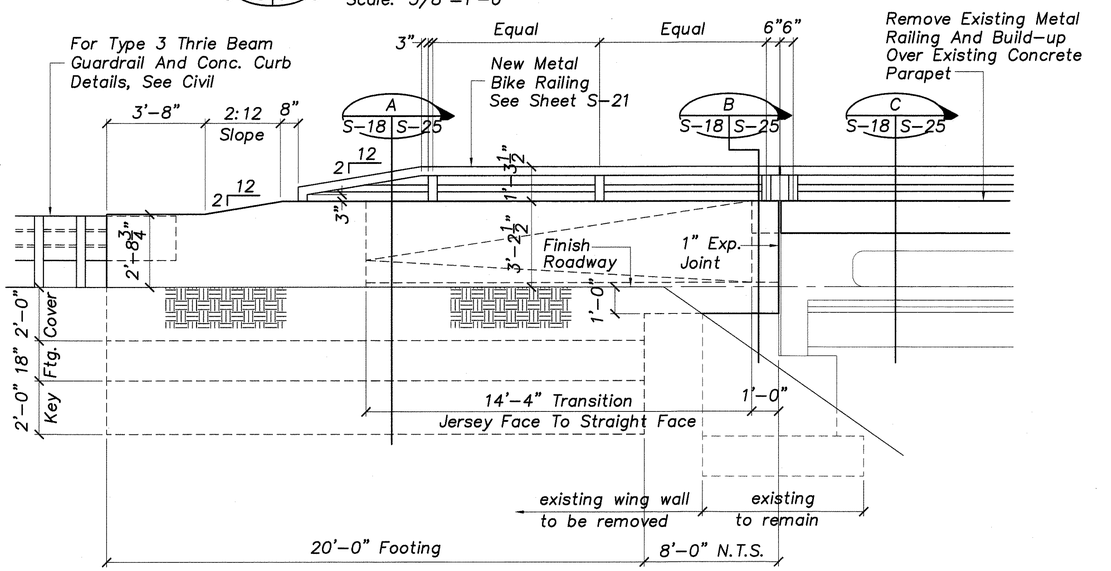
Scale: 1/8"=1'-0"



CONCRETE END POST PLAN

A S-18 S-18

Scale: 3/8"=1'-0"



CONCRETE END POST ELEVATION

Scale: 3/8"=1'-0"

Date	Revision
7/2/07	Revised New Retrofit Concrete End Post

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING WATERWAY STRUCTURE NO. 3 LAYOUT PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

GEORGE K. NISHIMURA LICENSED PROFESSIONAL ENGINEER No. 7388-S HAWAII, U.S.A.

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Signature
04/30/08
Expiration Date of Professional License

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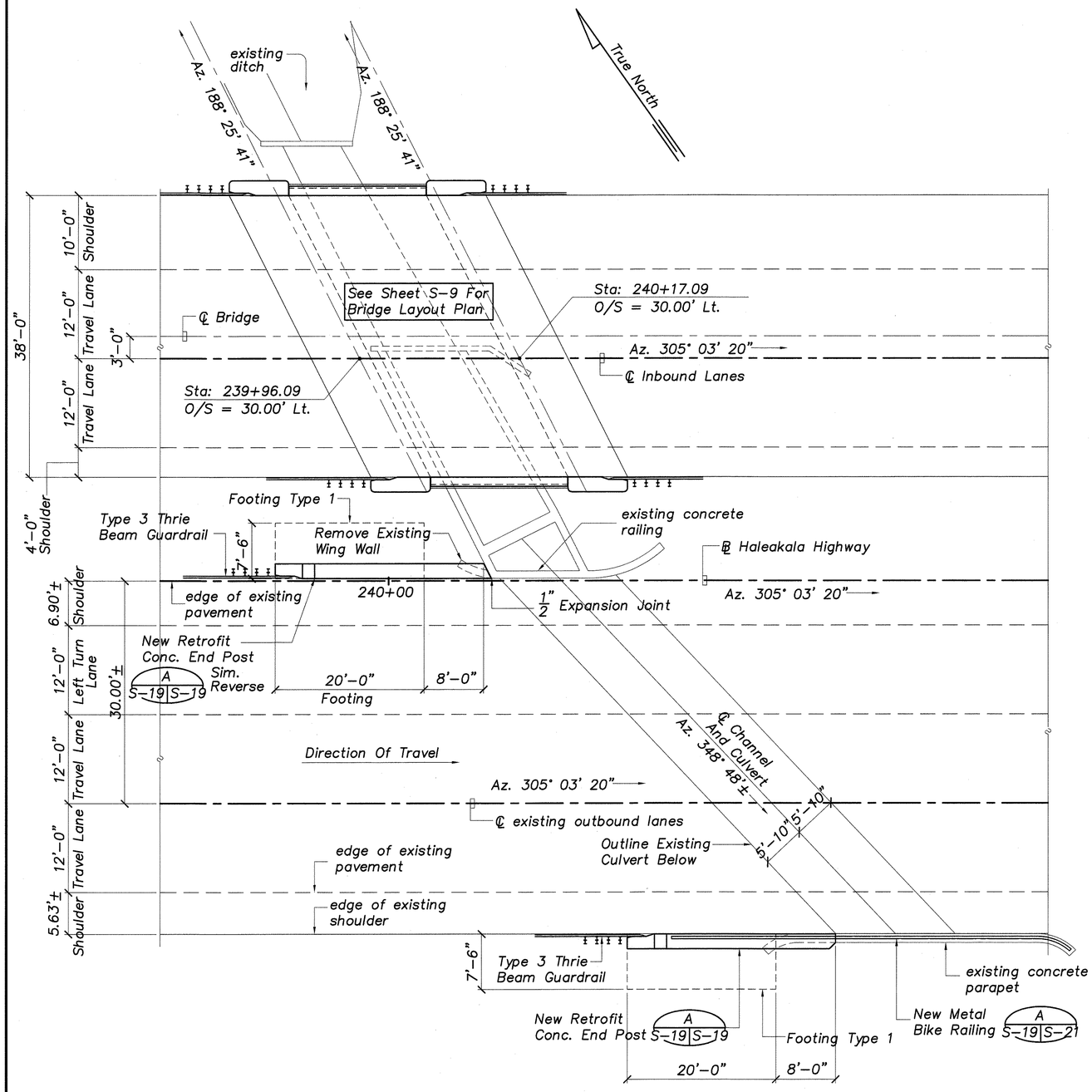
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
ORIGINAL PLAN
NOTE BOOK
No.

SHEET No. S-18 OF 26 SHEETS

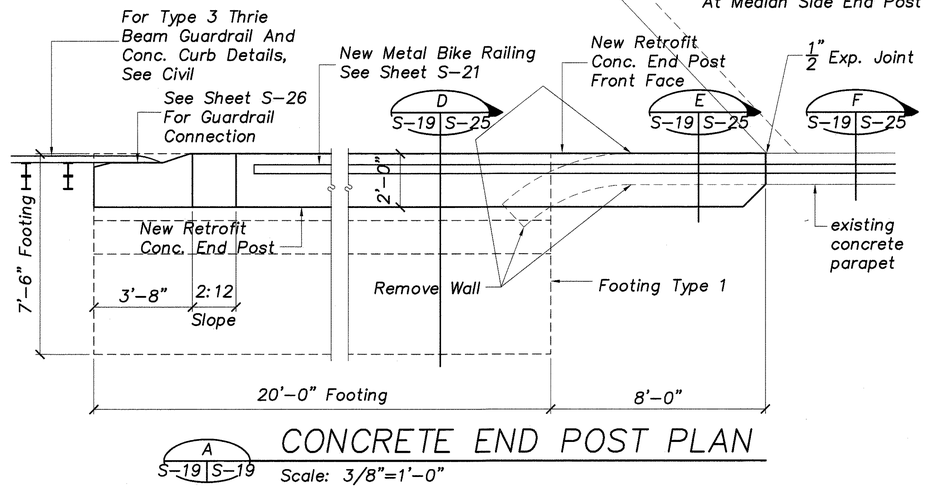
C.O. 251

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	C.O. 252	288



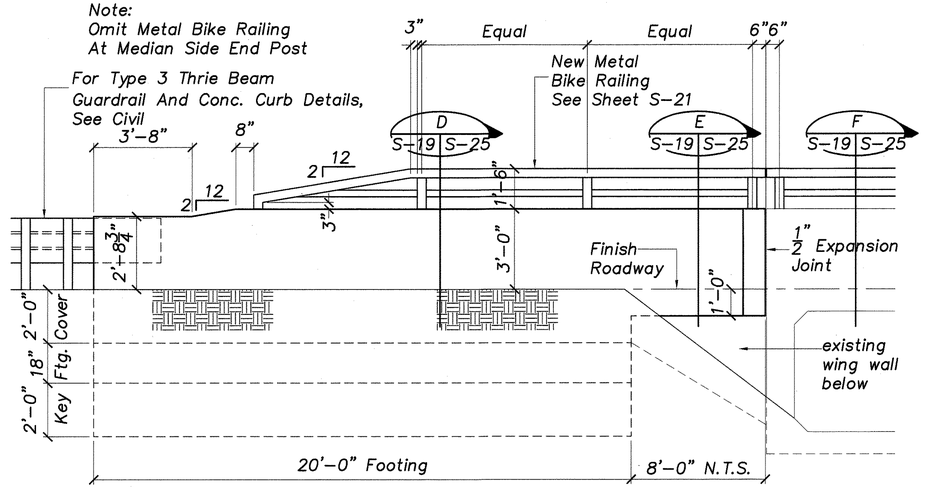
AT KAUHIKOA DITCH CROSSING
EXISTING WATERWAY STRUCTURE NO. 4 LAYOUT PLAN

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



CONCRETE END POST PLAN

A S-19 S-19 Scale: 3/8"=1'-0"



CONCRETE END POST ELEVATION

Scale: 3/8"=1'-0"

Date	Revision
7/2/07	Revised New Retrofit Concrete End Post

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING WATERWAY STRUCTURE NO. 4 LAYOUT PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-19 OF 26 SHEETS

GEORGE K. NISHIMURA LICENSED PROFESSIONAL ENGINEER No. 1886-S HAWAII, U.S.A.

02/26/08
Expiration Date of Professional License

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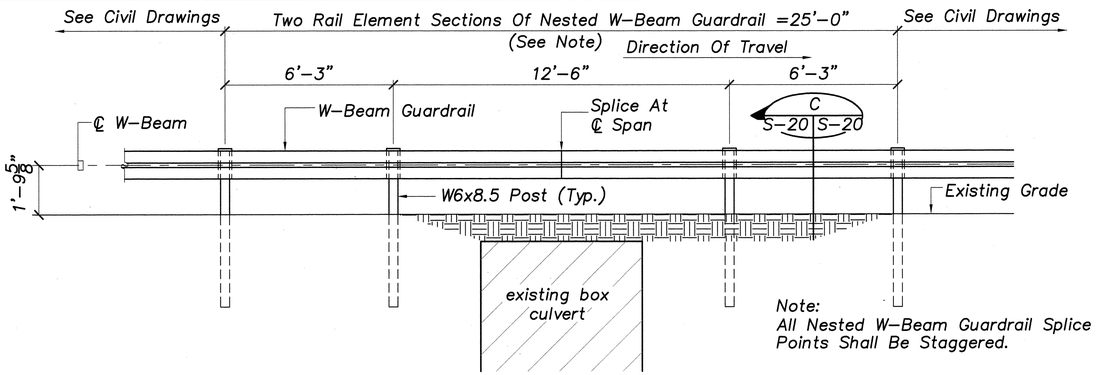
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTES BOOK | No.

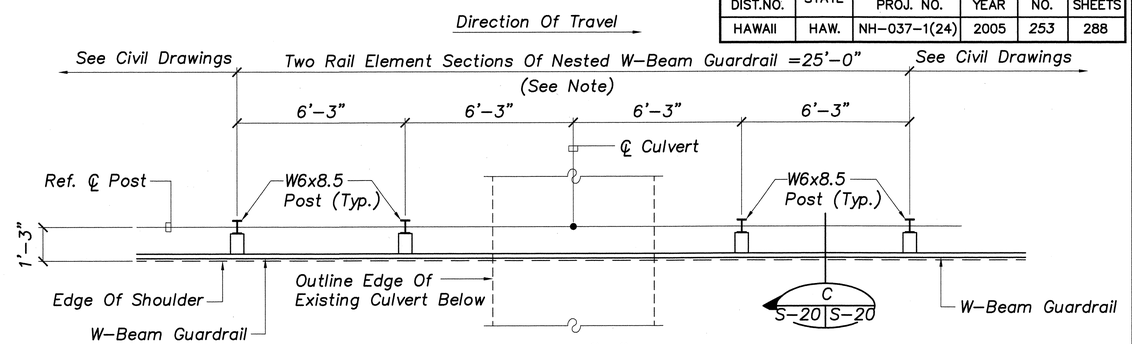
C.O. 252

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	253	288



GUARDRAIL TYPE "B" ELEVATION

Scale: 3/8"=1'-0"

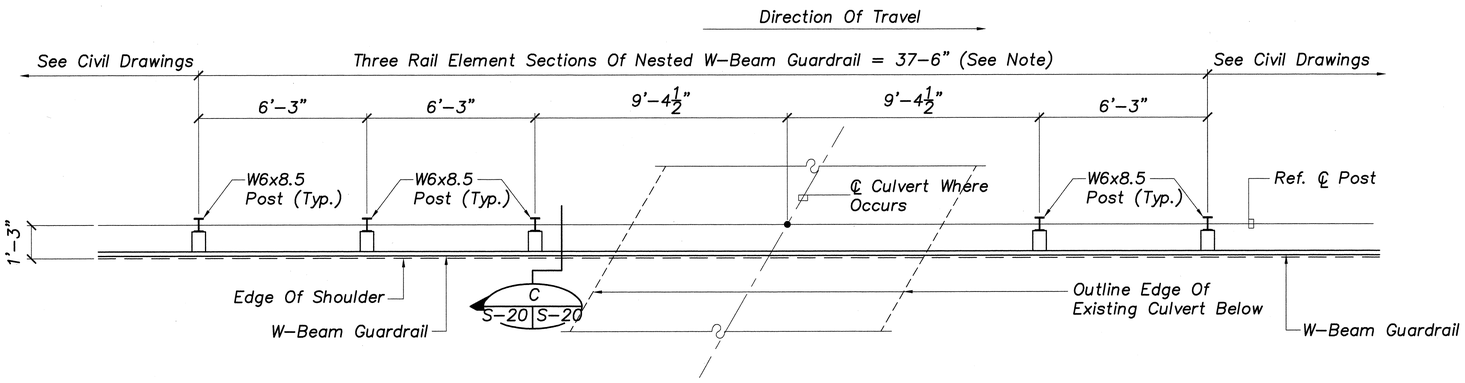


GUARDRAIL TYPE "B" DETAIL PLAN

Scale: 3/8"=1'-0"

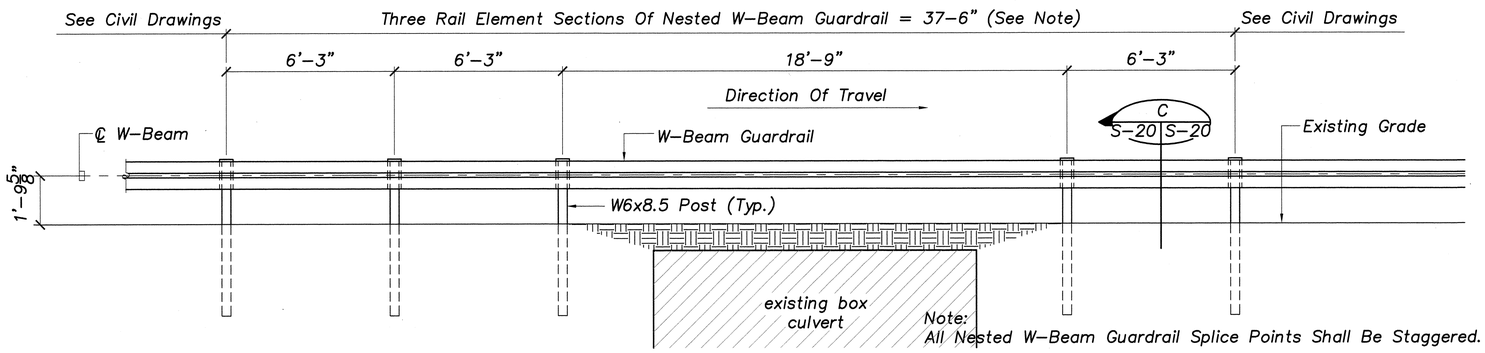
B S-17 S-20 GUARDRAIL TYPE "B" DETAIL

Scale As Noted



GUARDRAIL TYPE "A" DETAIL PLAN

Scale: 3/8"=1'-0"

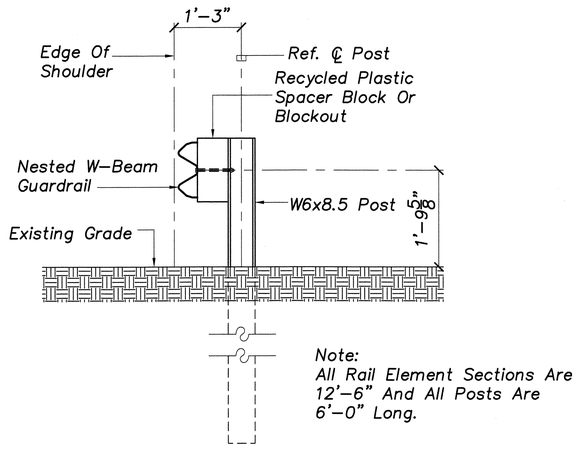


GUARDRAIL TYPE "A" ELEVATION

Scale: 3/8"=1'-0"

A S-16, S-19 S-20 GUARDRAIL TYPE "A" DETAIL

Scale As Noted



C S-20 S-20 SECTION

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

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

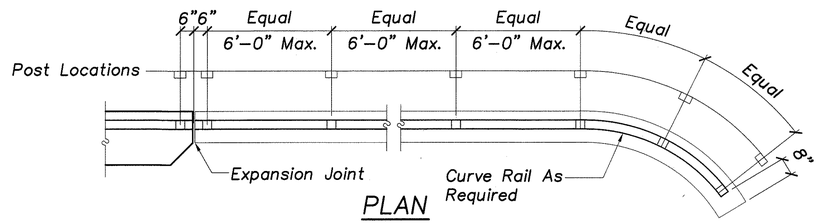
GUARDRAIL TYPE "A" AND TYPE "B" DETAIL

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

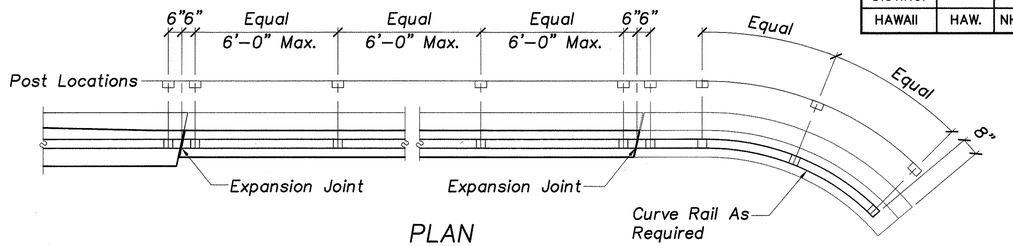
SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-20 OF 26 SHEETS

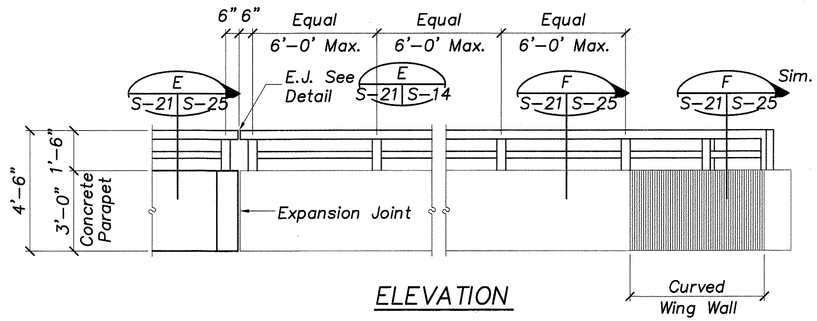
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	C.O. 254	288



PLAN

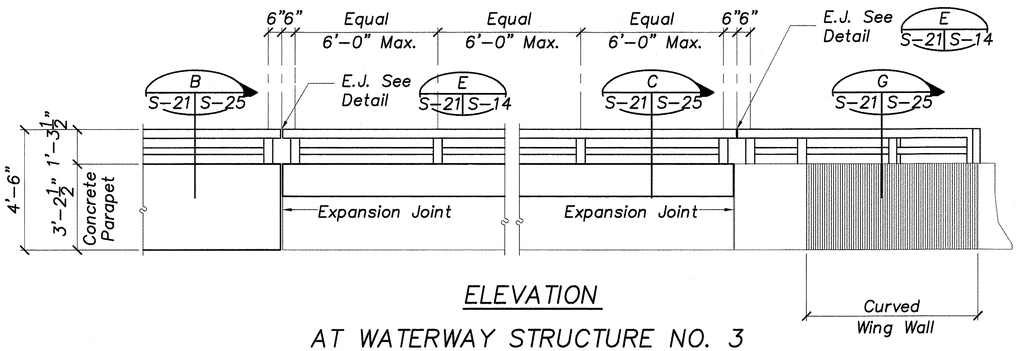


PLAN



ELEVATION

AT WATERWAY STRUCTURES NO. 1 AND 4

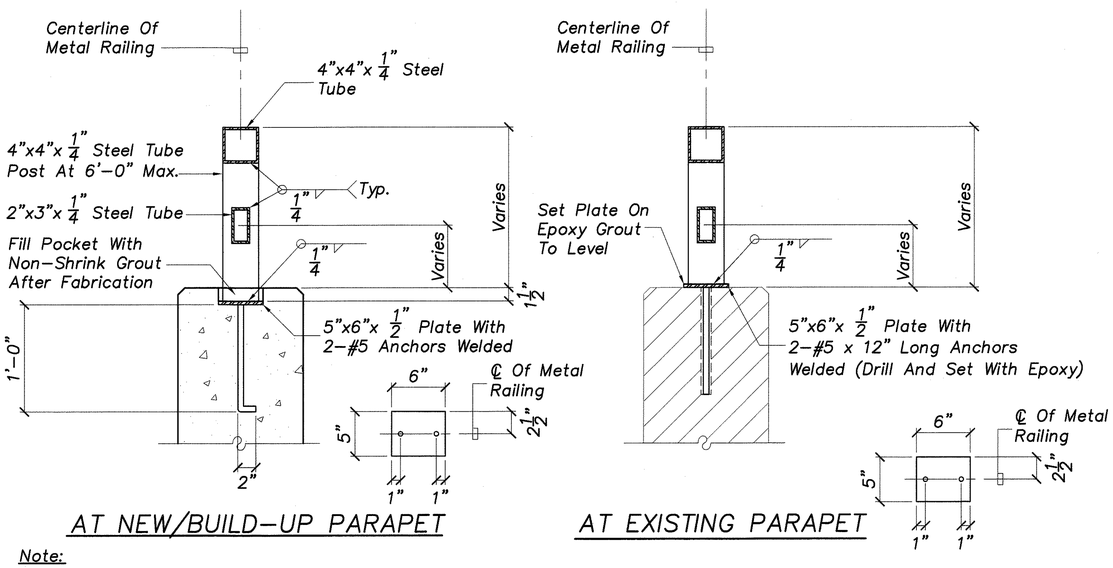


ELEVATION

AT WATERWAY STRUCTURE NO. 3

METAL BIKE RAILING DETAIL

A S-16, S-18, S-19 S-21 S-25 Scale As Noted



AT NEW/BUILD-UP PARAPET

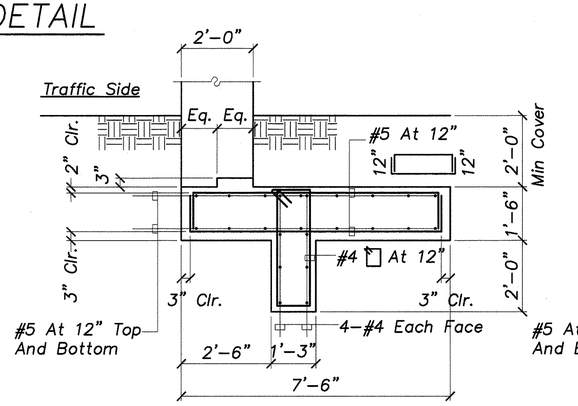
AT EXISTING PARAPET

Note:

1. Grind All Exposed Welded Joints On Metal Railing Smooth.
2. Metal Railing Assembly Shall Be Hot Dipped Galvanized After Fabrication.
3. Reinforcing Bars To Be Welded Shall Conform To ASTM A706, Grade 60.

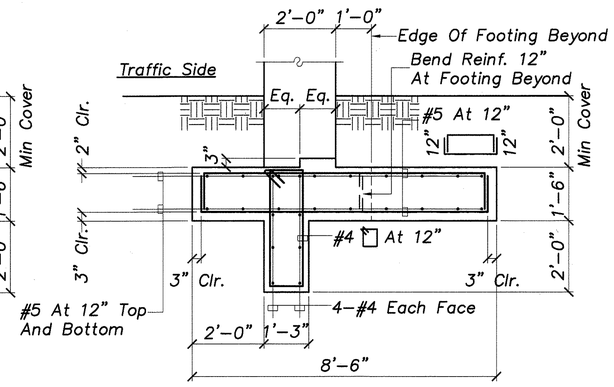
BIKE RAILING SECTION

B S-21, S-25 S-21 Scale: 1 1/2"=1'-0"



FOOTING TYPE 1

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



FOOTING TYPE 2

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

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | No.

Date	Revision
7/2/07	Added Footing Details (Type 1 And Type 2)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

METAL BIKE RAILING DETAIL

GEORGE K. NISHIMURA LICENSED PROFESSIONAL ENGINEER No. 1889-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Signature 04/30/08

Expiration Date of Professional License

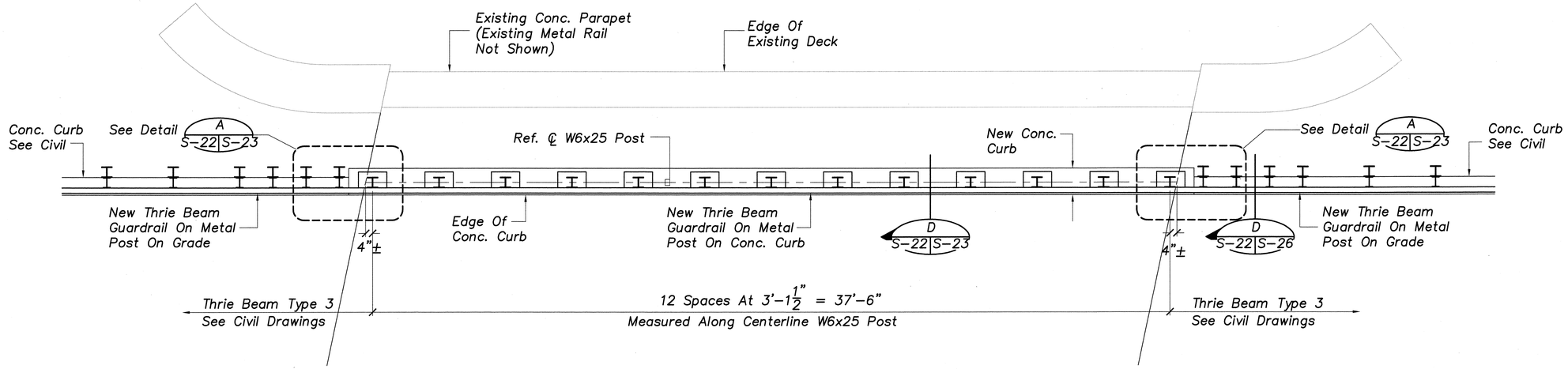
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-21 OF 26 SHEETS

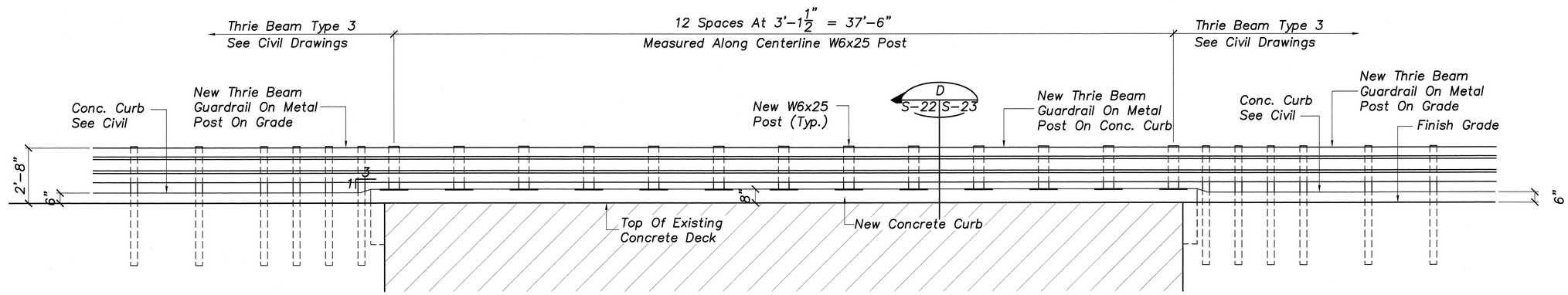
C.O. 254

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	255	288



GUARDRAIL TYPE "C" DETAIL PLAN

Scale: 3/8"=1'-0"



GUARDRAIL TYPE "C" ELEVATION

Scale: 3/8"=1'-0"

A S-18 S-22

GUARDRAIL TYPE "C" DETAILS

Scale As Noted

ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

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SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

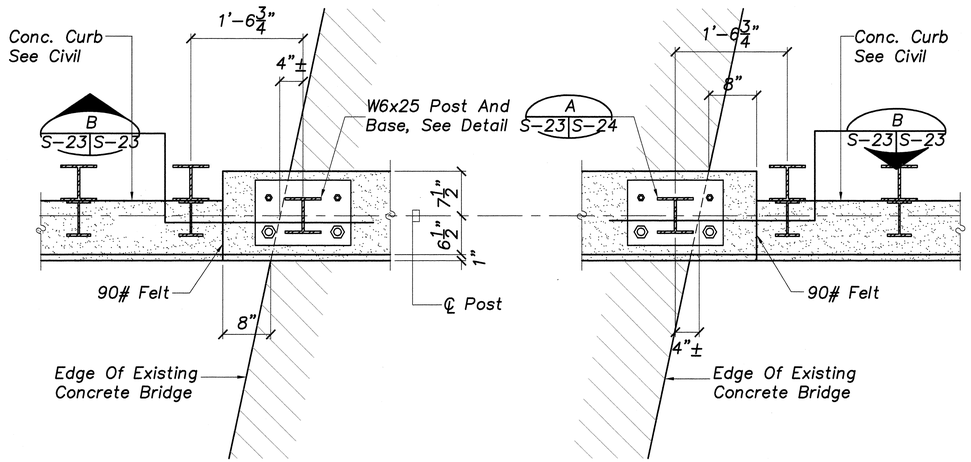
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
GUARDRAIL TYPE "C" DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

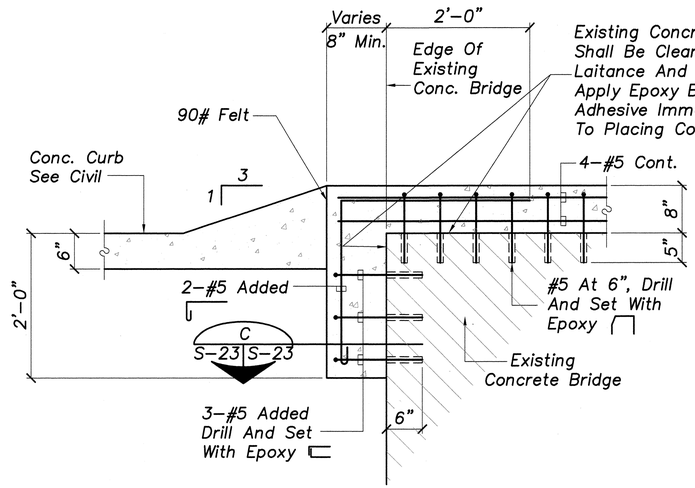
SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-22 OF 26 SHEETS

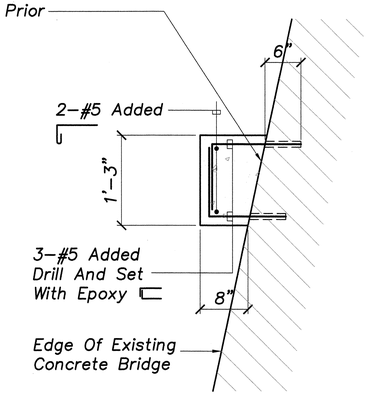
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	256	288



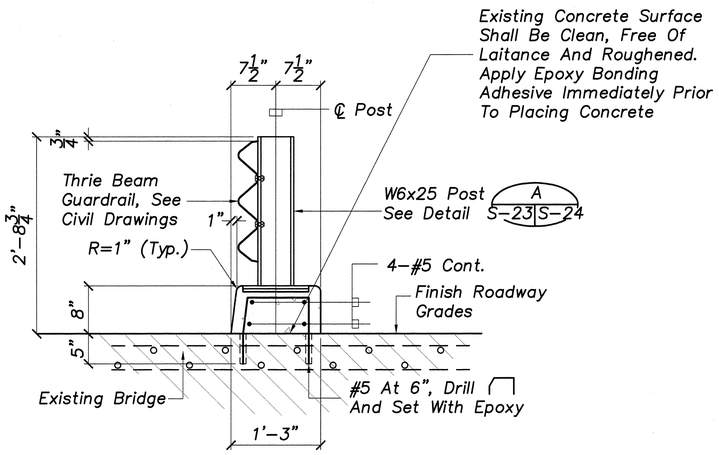
A S-22|S-23 **DETAIL PLAN**
Scale: 1"=1'-0"



B S-23|S-23 **SECTION**
Scale: 1"=1'-0"



C S-23|S-23 **SECTION**
Scale: 1"=1'-0"



Note: Reinforcing Bars In The Existing Bridge Deck Shall Not Be Cut Or Damaged. Refer To Structural Note (8) On Sheet S-2.

D S-22|S-23 **SECTION**
Scale: 1"=1'-0"

ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

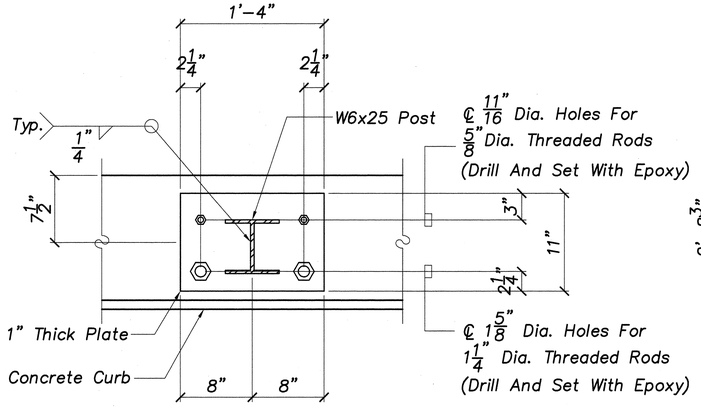
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
GUARDRAIL DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

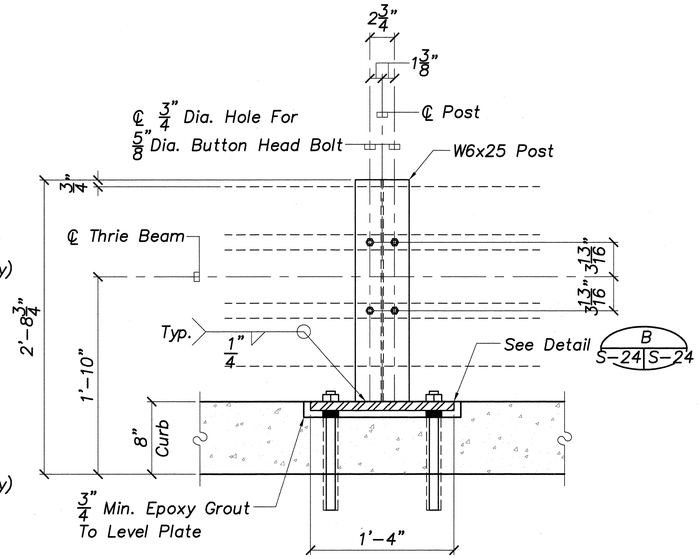
SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-23 OF 26 SHEETS

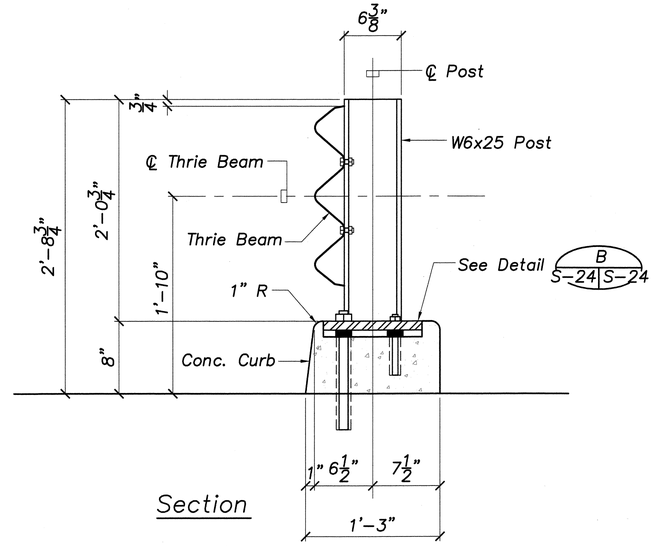
FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	257	288



Plan



Elevation

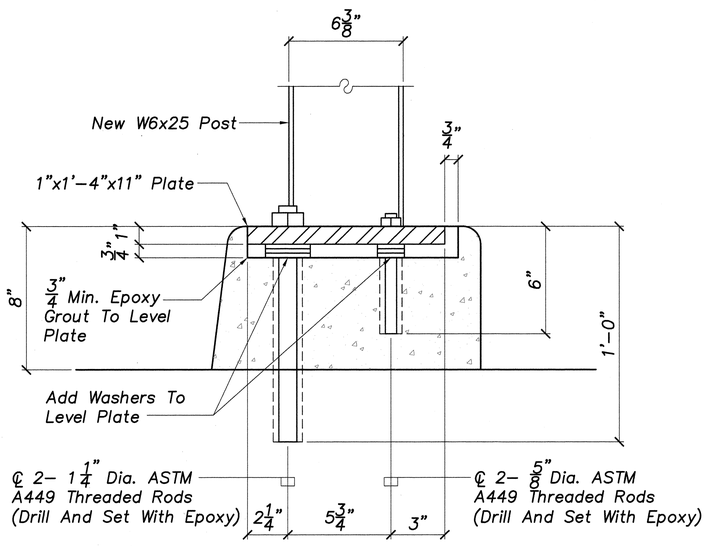


Section

W6x25 POST AND BASE DETAIL

A S-23 S-24

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



BASE PLATE DETAIL

B S-24 S-24

Scale: 3"=1'-0"

ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

04/30/06
EXPIRATION DATE OF PROFESSIONAL LICENSE

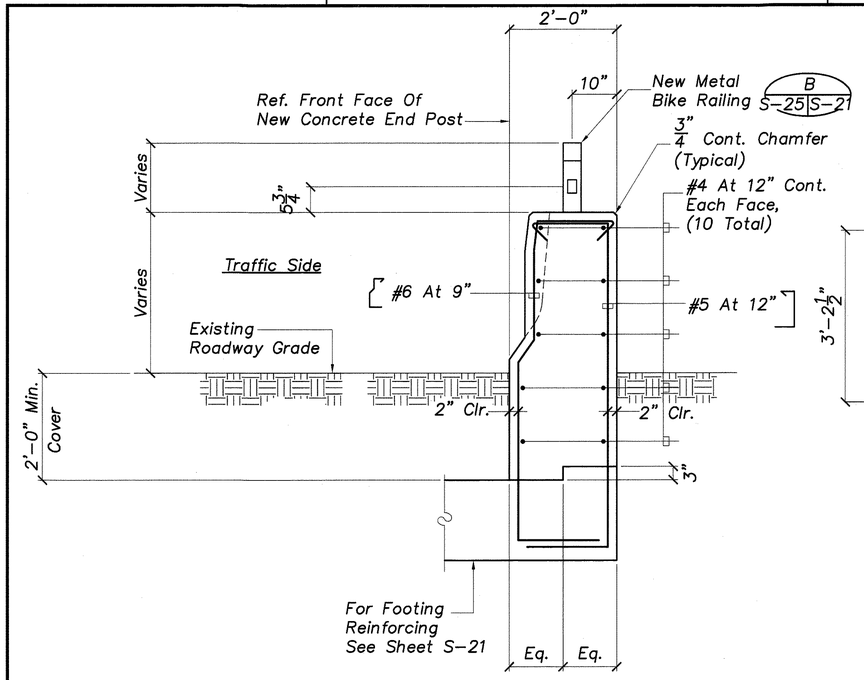
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
GUARDRAIL DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

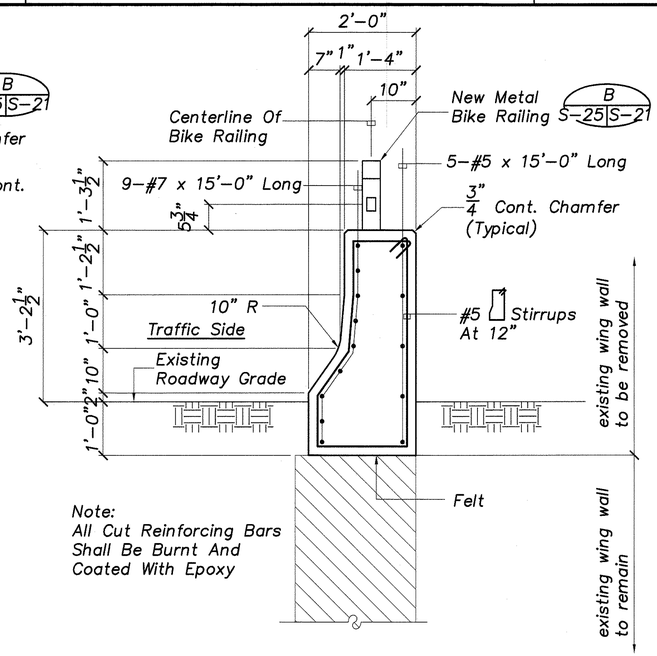
SCALE: AS NOTED DATE: MAY 2005

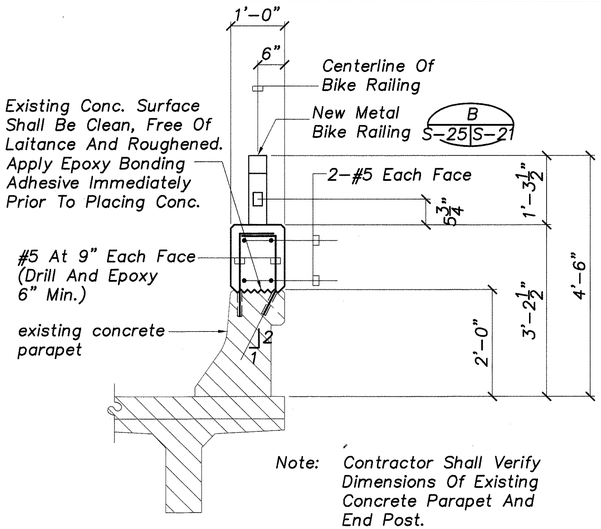
SHEET No. S-24 OF 26 SHEETS

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	C.O 258	288

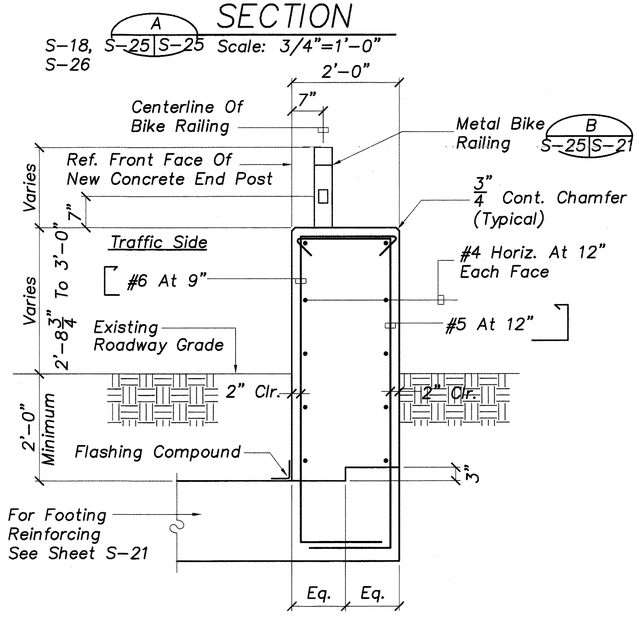


B
S-18, S-21|S-25 SECTION Scale: 3/4"=1'-0"

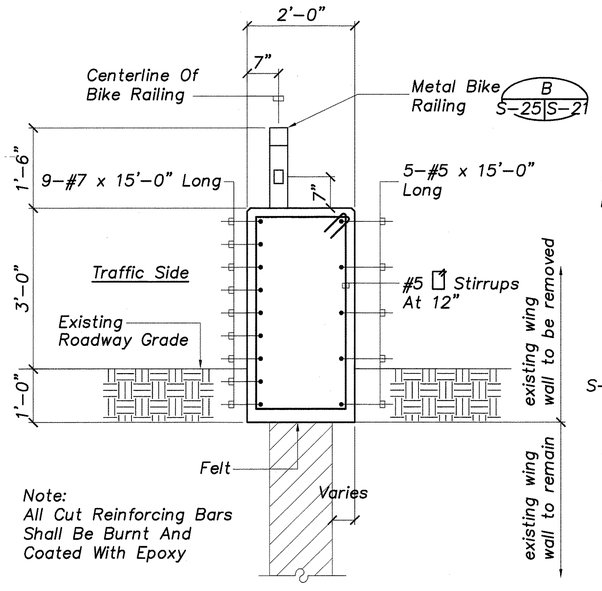




C
S-18, S-21|S-25 SECTION Scale: 3/4"=1'-0"

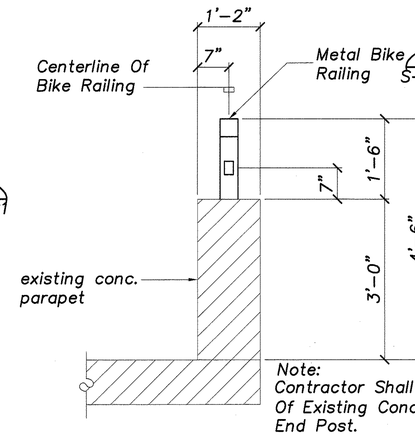


A
S-18, S-25|S-25 SECTION Scale: 3/4"=1'-0"
S-26

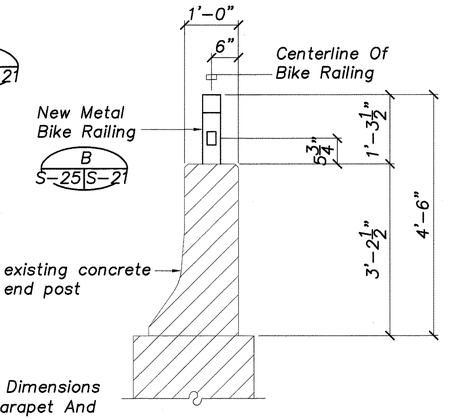


D
S-16, S-19|S-25 SECTION Scale: 3/4"=1'-0"

E
S-16, S-19, S-21|S-25 SECTION Scale: 3/4"=1'-0"



F
S-16, S-19, S-21|S-25 SECTION Scale: 3/4"=1'-0"



G
S-21|S-25 SECTION Scale: 3/4"=1'-0"

Date	Revision
7/2/07	Revised Sections A, B, D, And E

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETROFIT CONCRETE END POST DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-25 OF 26 SHEETS

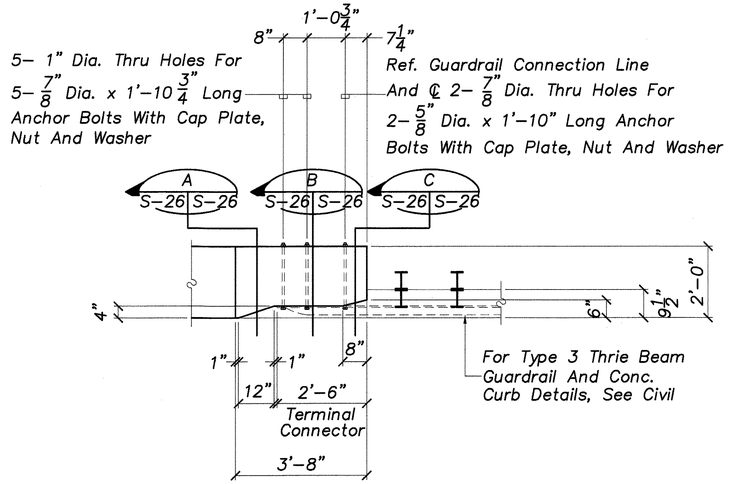
GEORGE K. NIELSEN LICENSED PROFESSIONAL ENGINEER No. 1329-S HAWAII, U.S.A.

THIS PLAN WAS PREPARED BY ME OR UNDER MY SUPERVISION
Signature 04/20/08
Registered Profes sional Engineer/Licensee

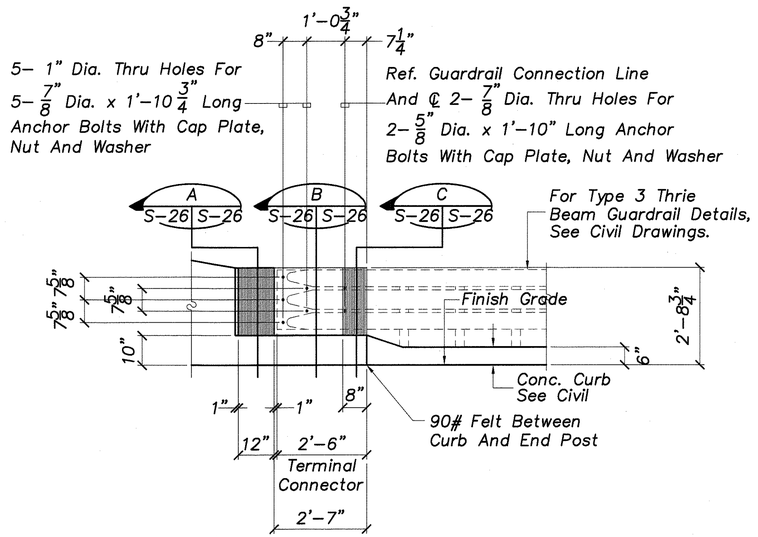
ORIGINAL PLAN | NOTE BOOK | No.
SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

C.O. 258

FED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	C.O. 259	288



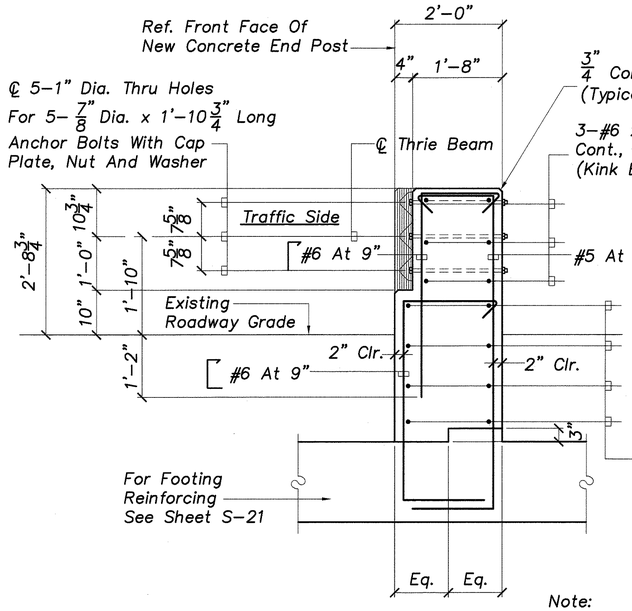
PLAN VIEW



ELEVATION

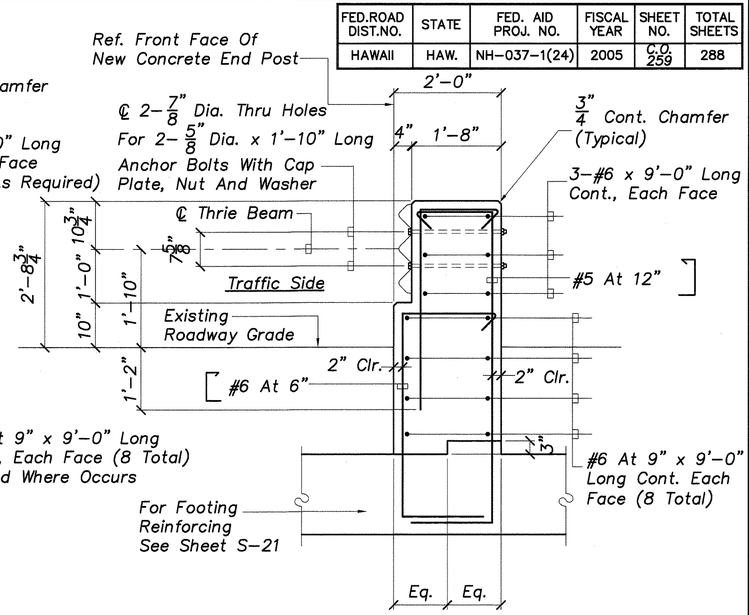
PARAPET TO GUARDRAIL CONNECTION DETAIL

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



A S-26 S-26 SECTION

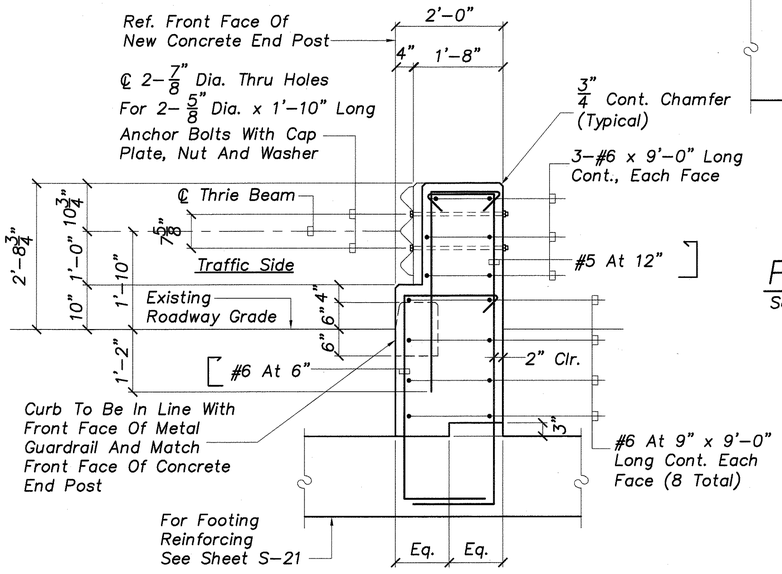
Scale: 3/4"=1'-0"



B S-26 S-26 SECTION

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

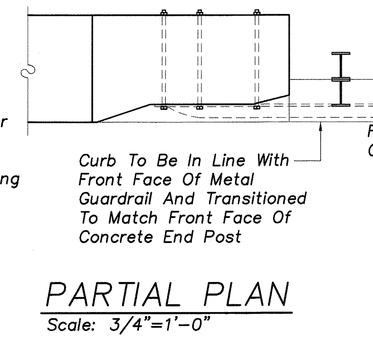
Note:
Metal Bike Railing Not Shown For Clarity.



Note:
Metal Bike Railing Not Shown For Clarity.

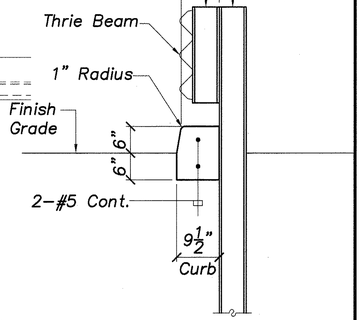
C S-26 S-26 SECTION

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



PARTIAL PLAN

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



D S-22 S-26 SECTION

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

ORIGINAL SURVEY PLOTTED BY ..... DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
NOTE BOOK
No.

GEORGE K. NISHIMURA LICENSED PROFESSIONAL ENGINEER No. 1892-S HAWAII, U.S.A.

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Signature
07/30/08
Expiration Date of Professional License

Date	Revision
7/2/07	Revised Sections A, B, And C

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETROFIT CONCRETE END POST DETAILS

RALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY 2005

SHEET No. S-26 OF 26 SHEETS

C.O. 259