UAOA BRIDGE GENERAL NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 45	70

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," SECOND EDITION, 1998.
3. LOADS:
   - A. DEAD LOAD: AN ALLOWANCE OF 2 INCHES FOR FUTURE WEARING SURFACE OF ASPHALT CONCRETE HAS BEEN PROVIDED FOR IN THE DESIGN.
   - B. LIVE LOAD: HL-93
   - C. SEISMIC LOAD: ACCELERATION COEFFICIENT = 0.25
     SEISMIC PERFORMANCE ZONE = 3
     IMPORTANCE CATEGORY = ESSENTIAL BRIDGE SOIL PROFILE TYPE I
   - D. RAILING TEST LEVEL = TL-4
4. MATERIALS:
   - A. MINIMUM CONCRETE COMPRESSIVE STRENGTH (AT 28 DAYS) SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
     1) COLUMNS = 5,000 PSI
     2) ALL OTHER CONCRETE = 4,000 PSI.
   - B. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, UNLESS OTHERWISE NOTED.
   - C. ALL COLUMN AND DRILLED SHAFT SPIRAL REINFORCING SHALL BE DEFORMED REINFORCING BARS CONFORMING TO ASTM A615, GRADE 60.
   - D. ALL MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 AND BE HOT DIP GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE NOTED.
   - E. ALL PIPE SECTIONS SHALL CONFORM TO ASTM A53 (TYPE E), GRADE B, AND BE HOT DIP GALVANIZED AFTER FABRICATION.
   - F. ALL STRUCTURAL TUBE SECTIONS SHALL CONFORM TO ASTM A500, GRADE B, AND BE HOT DIP GALVANIZED AFTER FABRICATION.
   - G. ALL ANCHOR BOLTS, WASHERS AND NUTS SHALL CONFORM TO ASTM A307 AND BE HOT DIP GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE SPECIFIED.
   - H. FOR MATERIALS OF PRESTRESSED CONCRETE GIRDERS, SEE APPLICABLE PRESTRESSED CONCRETE NOTES.
   - I. ELASTOMERIC BEARING PADS SHALL BE 60 HARDNESS. STEEL LAMINATIONS SHALL BE 1/8 INCHES THICK ASTM A36 STEEL PLATES.
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 SLABS
        - A) TOP BARS = 2"
        - B) BOTTOM BARS = 1-1/4"
     2) RAILINGS AND PARAPETS = 2"
     3) FOR PRESTRESSED CONCRETE GIRDERS, SEE PRESTRESSED CONCRETE GIRDER DETAILS.
     4) COLUMNS = 3" (TO SPIRALS)
     5) ABUTMENT WALLS AND WING WALLS = 2"
     6) CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3"
     7) DRILLED SHAFTS = 3" (TO SPIRALS)
   - B. REINFORCING BARS SHALL BE DETAILED IN ACCORDANCE WITH ACI DETAILING MANUAL FOR REINFORCED CONCRETE HIGHWAY STRUCTURES UNLESS OTHERWISE NOTED.
   - C. MINIMUM CLEAR SPACING BETWEEN PARALLEL BARS SHALL BE 1-1/2 TIMES THE DIAMETER OF BARS (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.
   - D. ALL DIMENSIONS RELATING TO REINFORCING BARS (E.G. SPACING OF BARS, ETC.) ARE TO CENTERS OF BARS UNLESS OTHERWISE NOTED.
   - E. REINFORCING BARS SHALL BE SECURELY TIED AT ALL INTERSECTIONS AND LAP SPLICES EXCEPT WHERE THE SPACING OF INTERSECTIONS IS LESS THAN ONE FOOT IN EACH DIRECTION, IN WHICH CASE ALTERNATE INTERSECTIONS SHALL BE TIED.
   - F. ALL BARS SHOWN WITH BENDS SHALL CONFORM TO STANDARD ACI HOOKS UNLESS OTHERWISE NOTED.
   - G. VERTICAL DRILLED SHAFT BARS SHALL BE ARRANGED IN SUCH A MANNER AS TO AVOID INTERFERENCE WITH FOOTING BARS. TOP BENDS OF VERTICAL BARS SHALL BE ARRANGED TO FIT WITHIN LIMITS OF THE FOOTING. MINIMUM EMBEDMENT SHOWN SHALL BE PROVIDED. NO BARS SHALL BE CUT.
   - H. COLUMN SPIRALS SHALL BE SPLICED WITH MECHANICAL CONNECTORS, UNLESS OTHERWISE NOTED.
6. GIRDER BEARINGS:
   - A. BEARING SURFACE SHALL BE SMOOTH AND LEVEL. GIRDERS SHALL BE SET ON A FRESH LAYER OF MORTAR TO INSURE FULL BEARING.
   - B. GIRDER SEAT ELEVATIONS SHALL BE VERIFIED BY THE CONTRACTOR. SEAT ELEVATIONS SHALL TAKE INTO CONSIDERATION THE VERTICAL ROADWAY CURVE DIFFERENTIAL, DECK SLAB THICKNESS, MINIMUM HAUNCH REQUIRED, GIRDER DEPTH, AND THE CALCULATED OR, IF AVAILABLE, THE ACTUAL CAMBER OF THE GIRDERS.
   - C. THE CONCRETE SEAT AND ELASTOMERIC BEARING PAD SHALL BE PERPENDICULAR TO THE CENTERLINE OF THE GIRDER.
7. CONSTRUCTION NOTES:
   - A. SEE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.
   - B. TOP OF CONCRETE DECK SLAB SHALL BE CONSTRUCTED TO FOLLOW THE ROADWAY FINISH GRADES. THE CONTRACTOR SHALL SET DECK SLAB FORMS TO ACCOUNT FOR ANTICIPATED DEFLECTION OF GIRDERS DURING PLACEMENT OF CONCRETE FOR DECK SLAB AND DIAPHRAGMS. ALSO, SEE PRESTRESSED GIRDER NOTES.
   - C. UNLESS OTHERWISE NOTED, ALL VERTICAL DIMENSIONS ARE MEASURED PLUMB.
   - D. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS BEFORE COMMENCING WITH WORK.
   - E. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITY LINES AND NOTIFY THE RESPECTIVE OWNERS BEFORE COMMENCING THE WORK OF EXCAVATION OR DRILLED SHAFTS.
   - F. FOR CONCRETE FINISH, SEE STANDARD SPECIFICATIONS.
   - G. CONSTRUCTION JOINTS MAY BE RELOCATED OR ADDITIONAL ONES ADDED SUBJECT TO THE APPROVAL OF THE ENGINEER.
   - H. UNLESS OTHERWISE NOTED, ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4" X 3/4".
   - I. ELASTOMERIC BEARING PADS SHALL BE SECURED TO THE CONCRETE BEARING SURFACE WITH ADHESIVES OR OTHER MEANS NECESSARY AS APPROVED BY THE ENGINEER.
   - J. THE CONTRACTOR SHALL RESTRAIN THE GIRDERS IN THE LONGITUDINAL DIRECTION DURING PLACEMENT.
   - K. SHORING SHALL BE PROVIDED FOR THE EXISTING BRIDGE FOOTINGS DURING CONSTRUCTION OF THE NEW PIER FOOTING.
   - L. JUST PRIOR TO CONSTRUCTION OF THE PIER NO. 2 FOOTING, REMOVE THE PORTION OF THE EXISTING BENT NO. 8 FOOTING THAT INTERFERES WITH THE NEW FOOTING. EXISTING FOOTING SHALL BE VERIFIED AND REMOVED AS DIRECTED BY THE ENGINEER.
   - M. JUST PRIOR TO CONSTRUCTION OF THE PIER NO. 1 FOOTING, REMOVE THE PORTION OF THE EXISTING CRM WALL, THAT INTERFERES WITH THE NEW FOOTING. EXISTING CRM WALL SHALL BE VERIFIED, REMOVED AND REPLACED AS DIRECTED BY THE ENGINEER.
8. GENERAL:
   - A. ALL ITEMS NOTED INCIDENTAL WILL NOT BE PAID FOR SEPARATELY.
   - B. 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.
   - C. THE CONTRACTOR SHALL COMPLY WITH ALL CONSTRUCTION PERMITS FOR THIS PROJECT. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ANY NPDES PERMITS AND LICENSES THAT MAY BE REQUIRED FOR THE WORK.
   - D. THE CONTRACTOR SHALL UTILIZE APPROPRIATE EROSION CONTROL MEASURES DURING CONSTRUCTION AND SHALL PERFORM CONSTRUCTION ACTIVITIES AFFECTING OR AFFECTED BY THE STREAM ONLY DURING PERIODS OF LOW STREAM FLOW. THE CONTRACTOR SHALL PREVENT DEBRIS AND CONSTRUCTION MATERIALS, INCLUDING CEMENT OR CONCRETE, PETROLEUM PRODUCTS, AND OTHER POLLUTANTS FROM ENTERING THE STREAM. WASH AND DUST CONTROL WATER SHALL BE PROPERLY DISPOSED.
   - E. IN THE EVENT THAT SUBSURFACE CULTURAL REMAINS SUCH AS ARTIFACTS, BURIALS OR DEPOSITS OF SHELLS OR CHARCOAL ARE ENCOUNTERED DURING EXCAVATION WORK, THE CONTRACTOR SHALL STOP WORK IN THE AREA OF THE FIND AND CONTACT THE ENGINEER IMMEDIATELY. WORK MAY RECOMMENCE ONLY WITH ENGINEER'S APPROVAL.
9. FOUNDATION:

THESE FOUNDATION NOTES WERE BASED ON RECOMMENDATIONS CONTAINED IN A FOUNDATION INVESTIGATION REPORT BY ERNEST K. HIRATA AND ASSOCIATES, INC. DATED DECEMBER 10, 1998. THE REPORT SHALL BE CONSIDERED AS PART OF THE CONSTRUCTION DOCUMENTS AND ITS RECOMMENDATIONS SHALL BE IMPLEMENTED UNLESS OTHERWISE DIRECTED BY THE SOILS ENGINEER.

- A. DRILLED SHAFTS:
  1) THE VERTICAL LOAD CAPACITY FOR THE 48 INCHES DIAMETER DRILLED SHAFTS ARE FROM FRICTION BETWEEN THE SHAFT AND THE SURROUNDING SOILS. THE FOLLOWING NET VERTICAL LOAD PARAMETERS WERE USED FOR DESIGN:
     - A) ABUTMENT NO. 1:
       - ESTIMATED SHAFT TIP ELEVATION = 373.00'
       - -STRENGTH LIMIT STATE = 2070 KIPS
       - -EXTREME EVENT LIMIT STATE = 3120 KIPS
       - ESTIMATED SHAFT TIP ELEVATION = 453.00'
       - -STRENGTH LIMIT STATE = 617 KIPS
       - -EXTREME EVENT LIMIT STATE = 950 KIPS
     - B) ABUTMENT NO. 2:
       - -STRENGTH LIMIT STATE = 775 KIPS
       - -EXTREME EVENT LIMIT STATE = 1230 KIPS
     - C) PIER NO. 1 AND NO. 2:
       - -STRENGTH LIMIT STATE = 1072 KIPS
       - -EXTREME EVENT LIMIT STATE = 1650 KIPS
  2) THE VERTICAL UPLIFT LOAD CAPACITY FOR THE 48 INCHES DIAMETER DRILLED SHAFTS ARE FROM FRICTION BETWEEN THE SHAFT AND SURROUNDING SOIL AND BASALT. THE FOLLOWING NET VERTICAL UPLIFT LOAD PARAMETERS WERE USED FOR DESIGN:
     - A) ABUTMENT NO. 1:
       - -STRENGTH LIMIT STATE = -350 KIPS
       - -EXTREME EVENT LIMIT STATE = -350 KIPS
     - B) ABUTMENT NO. 2:
       - -EXTREME EVENT LIMIT STATE = -200 KIPS
  3) THE FOLLOWING LATERAL LOAD CAPACITIES FOR THE 48 INCHES DIAMETER DRILLED SHAFTS (FIXED - HEAD CONDITION) WERE USED FOR DESIGN:
     - A) ABUTMENT NO. 1 = 147 KIPS
     - B) ABUTMENT NO. 2 = 159 KIPS
     - C) PIER NO. 1 AND NO. 2 = 160 KIPS
  4) THE DRILLED SHAFT ESTIMATED TIP ELEVATION SHOWN ON THE PLANS ARE BASED ON THE BORING DATA. THE ACTUAL TIP ELEVATION COULD CHANGE DUE TO VARYING SUBSURFACE CONDITIONS. SOILS ENGINEER OF RECORD SHALL BE PRESENT DURING THE DRILLING OPERATION TO DETERMINE THAT THE ACTUAL SUBSURFACE CONDITIONS ARE CONSISTENT WITH THE CONDITIONS ASSUMED FOR DESIGN. BASED ON THE RECOMMENDATIONS, THE TIP ELEVATIONS COULD CHANGE. THE CONTRACTOR SHALL MAKE PROVISIONS TO ACCOUNT FOR VARIATIONS IN THE FINAL TIP ELEVATIONS.
  5) THE CONTRACTOR SHALL EXERCISE CARE IN DRILLING THE SHAFT HOLES AND IN PLACING CONCRETE INTO THE HOLES. ROCK DRILLING/CORING EQUIPMENT WILL BE REQUIRED FOR DRILLED SHAFTS EXTENDING THROUGH HARD BASALT LAYERS. TEMPORARY CASING MAY BE NEEDED TO REDUCE THE POTENTIAL FOR CAVING IN OF THE HOLES. THE USE OF PERMANENT CASING WILL NOT BE ALLOWED.
  6) DRILLING SHALL NOT BE CONDUCTED BY METHODS UTILIZING DRILLING FLUIDS.
  7) CONCRETE FOR DRILLED SHAFTS SHALL BE PLACED WITHIN 24 HOURS AFTER DRILLING TO REDUCE THE POTENTIAL FOR CAVING IN.
  8) SINCE GROUNDWATER WILL LIKELY BE ENCOUNTERED IN THE DRILLED HOLES, PLACEMENT OF CONCRETE SHALL BE BY TREMIE METHODS. A MINIMUM OF 10 FEET OF CONCRETE HEAD SHALL BE MAINTAINED ABOVE THE BOTTOM OF THE TREMIE PIPE DURING PLACEMENT OF CONCRETE.
   - B. ABUTMENTS AND WING WALLS:
     1) DESIGN EQUIVALENT FLUID PRESSURE:
        - A) LEVEL BACKFILL:
          - ACTIVE = 40 PCF
          - AT-REST = 55 PCF
        - B) 2H:1V SLOPING BACKFILL:
          - ACTIVE = 50 PCF
          - AT-REST = 55 PCF
     2) PASSIVE EARTH PRESSURE = 300 PCF (3,000 PSF MAXIMUM)
     3) BACKFILL MATERIAL:
        - A) THE ONSITE CLAYEY SILT AND HIGHLY TO COMPLETELY WEATHERED BASALT MAY BE REUSED AS BACKFILL PROVIDED ALL ROCK FRAGMENTS LARGER THAN 6 INCHES IN MAXIMUM DIMENSION ARE REMOVED PRIOR TO COMPACTION.
        - B) IMPORTED STRUCTURAL BACKFILL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS FOR STRUCTURE BACKFILL MATERIAL A AS INDICATED IN SECTION 703.20 OR THE HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION, 1994.
        - C) PLACEMENT OF THE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS.
   - C. MECHANICALLY STABILIZED EARTH RETAINING WALL SYSTEM:
     1) INTERNAL FRICTION ANGLE = 42 DEGREES
     2) COHESION = 800 PSF
     3) ACTIVE EARTH PRESSURE = 40 PCF
     4) SEE SECTION 520 - MECHANICALLY STABILIZED EARTH RETAINING WALL SYSTEMS OF THE SPECIAL PROVISIONS.
10. TESTING AND DISPOSAL OF HAZARDOUS MATERIAL:
    - A. A TEST FOR HAZARDOUS MATERIALS SHALL BE CONDUCTED ON THE EXISTING BRIDGE TO BE DEMOLISHED. DISPOSAL OF HAZARDOUS MATERIALS SHALL BE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND COUNTY REQUIREMENTS.
    - B. A TEST FOR CREOSOTE TIMBERS SHALL BE CONDUCTED ON THE EXISTING BRIDGE TO BE DEMOLISHED. TESTING AND DISPOSAL SHALL BE IN ACCORDANCE WITH THE COUNTY OF MAUI, DEPARTMENT OF PUBLIC WORKS AND WASTE MANAGEMENT REQUIREMENTS.
    - C. FOR BIDDING PURPOSES, THE CONTRACTOR SHALL ASSUME THE DISPOSAL OF CREOSOTE TIMBERS AT A LINED LANDFILL, SUCH AS MAUI DEMOLITION & CONSTRUCTION LANDFILL, INC.
    - D. REFER TO SECTION 107.25 - CONTAMINATED AND/OR HAZARDOUS MATERIAL OF THE SPECIAL PROVISIONS.
11. PROTECTION OF EXISTING TUNNEL
    - A. CONTRACTOR SHALL VERIFY THE LOCATION OF THE EXISTING TUNNEL.
    - B. CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE EXISTING TUNNEL DURING CONSTRUCTION WORK.
    - C. ALL BRACING TO SUPPORT THE EXISTING TUNNEL SHALL BE DESIGNED AND STAMPED BY A LICENSED PROFESSIONAL ENGINEER RETAINED BY THE CONTRACTOR.
    - D. ALL COSTS SHALL BE BORNE BY THE CONTRACTOR.

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

DATE	REVISION
2/28/01	NOTE 9. C. REVISED
12/21/00	NOTE 9. A. 1. A) REVISED
12/18/00	NOTE 9. A. 1, 9. A.2, AND 9. A.3 REVISED
12/11/00	NOTE 9. A. REVISED AND "INDEX TO DRAWINGS" DELETED
12/4/00	NOTE 7. M. ADDED.

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES, INDEX TO DRAWINGS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-0 OF 26 SHEETS

C.O. 45

SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	CONTRACT ITEM	QUANTITY	UNIT
202.0440	REMOVAL OF BRIDGE	(1)	(EACH) L.S.
206.6000	STRUCTURE EXCAVATION FOR BRIDGE	5890	C.Y.
206.7000	STRUCTURE BACKFILL	4120	C.Y.
206.8000	FILTER MATERIAL	5	C.Y.
503.1090	CONCRETE IN BRIDGE	(3070)	(C.Y.) L.S.
504.4100	KEEHI IV PRESTRESSED CONCRETE GIRDERS	(1245)	(L.F.) L.S.
504.6100	KEEHI VI PRESTRESSED CONCRETE GIRDERS	(820)	(L.F.) L.S.
507.1501	METAL RAILING – TWO RAILS ON PARAPET FOR BRIDGE	645	L.F.
507.7001	CONCRETE PARAPET FOR BRIDGE (INCLUDING END POST)	680	L.F.
511.0020	LOAD TEST	1	EACH
511.0100	DRILLED SHAFT – 48 INCH DIAMETER	3430	L.F.
511.0200	UNCLASSIFIED SHAFT EXCAVATION	3430	L.F.
511.0300	UNCLASSIFIED EXTRA DEPTH EXCAVATION	150	L.F.
511.0400	DRILLED SHAFT SIDEWALL OVERREAMING	150	L.F.
511.0500	TRIAL SHAFT HOLES	70	L.F.
602.0091	REINFORCING STEEL IN BRIDGE	(839,000)	(LBS.) L.S.

ABBREVIATIONS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR–036–1(14)	2000	C.O. 46	70

Depressed "V" Letters 3/8" Deep

Use Correct Name Of Bridge *Date Of Year Built*

Note:

1. *Name And Date Shall Be Placed At An 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

INDEX TO DRAWINGS

SHEET NO.	DRAW NO.	DESCRIPTION
45	S–0	GENERAL NOTES
46	S–1	INDEX TO DRAWINGS, ABBREVIATIONS, SUMMARY OF ESTIMATED QUANTITIES
47	S–2	BRIDGE LAYOUT PLAN, LONGITUDINAL SECTION/ELEVATION, TYPICAL CROSS SECTION
48	S–3	EXISTING BRIDGE DEMOLITION PLAN, NORMAL DECK SECTION
49	S–4	FOUNDATION PLAN, WING WALL DETAILS, DRILLED SHAFT DETAILS
50	S–5	ABUTMENT NO. 1, PLAN AT ABUTMENT SHELF, DRILLED SHAFT LAYOUT PLAN
51	S–6	ABUTMENT NO. 1 ELEVATION AND SECTION, WING WALL ELEVATIONS
51S–1	S–6A	ABUTMENT NO. 1 SECTIONS
52	S–7	PLAN/SECTION AT ABUTMENT SHELF, EXPANSION JOINT DETAIL
53	S–8	ABUTMENT NO. 2, PLAN AT ABUTMENT SHELF, DRILLED SHAFT LAYOUT PLAN, WING WALL ELEVATION
54	S–9	ABUTMENT NO. 2 ELEVATION AND SECTION
55	S–10	PIER FOUNDATION PLAN AND SECTIONS
56	S–11	PIER SECTION
57	S–12	PIER CAP PLANS AND SECTIONS
58	S–13	DECK LAYOUT PLAN, DECK FRAMING PLAN, DIAPHRAGM DETAIL AT KEEHI VI GIRDER
59	S–14	DECK FRAMING PLANS, INTERMEDIATE DIAPHRAGM AT KEEHI IV GIRDER
60	S–15	NORMAL DECK SECTIONS, CONCRETE PARAPET DETAILS
61	S–16	DECK REINFORCING LAYOUT PLANS
62	S–17	KEEHI IV GIRDER DETAILS
63	S–18	KEEHI VI GIRDER DETAILS
64	S–19	TYPICAL END DIAPHRAGM GIRDER DETAILS
65	S–20	BEARING PAD, CONCRETE SEAT AND CREEP BLOCK DETAILS
66	S–21	TYPICAL GUARDRAIL TO END POST NO. 1 AND 2 CONNECTION DETAIL
67	S–22	TYP. PARAPET AND METAL RAIL DET., TYP. GUARDRAIL TO END POST NO. 3 CONNECTION DET.
68	S–23	PLAN AT MSERW RETAINING WALL, ELEVATION AT MSERW RETAINING WALL
69	S–24	MSERW RETAINING WALL DETAILS
70	S–25	TYPICAL GUARDRAIL TO END POST NO. 4 CONNECTION DETAIL

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

ORIGINAL PLAN
NOTE BOOK ____ No. ____

2/28/01	"INDEX TO DRAWINGS" REVISED
1/23/01	REVISED "SUMMARY OF ESTIMATED QUANTITIES"
12/18/00	"INDEX TO DRAWINGS" REVISED
12/11/00	ADDED AND REVISED "INDEX TO DRAWINGS"
DATE	REVISION

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES, ABBREVIATIONS SUMMARY OF ESTIMATED QUANTITIES

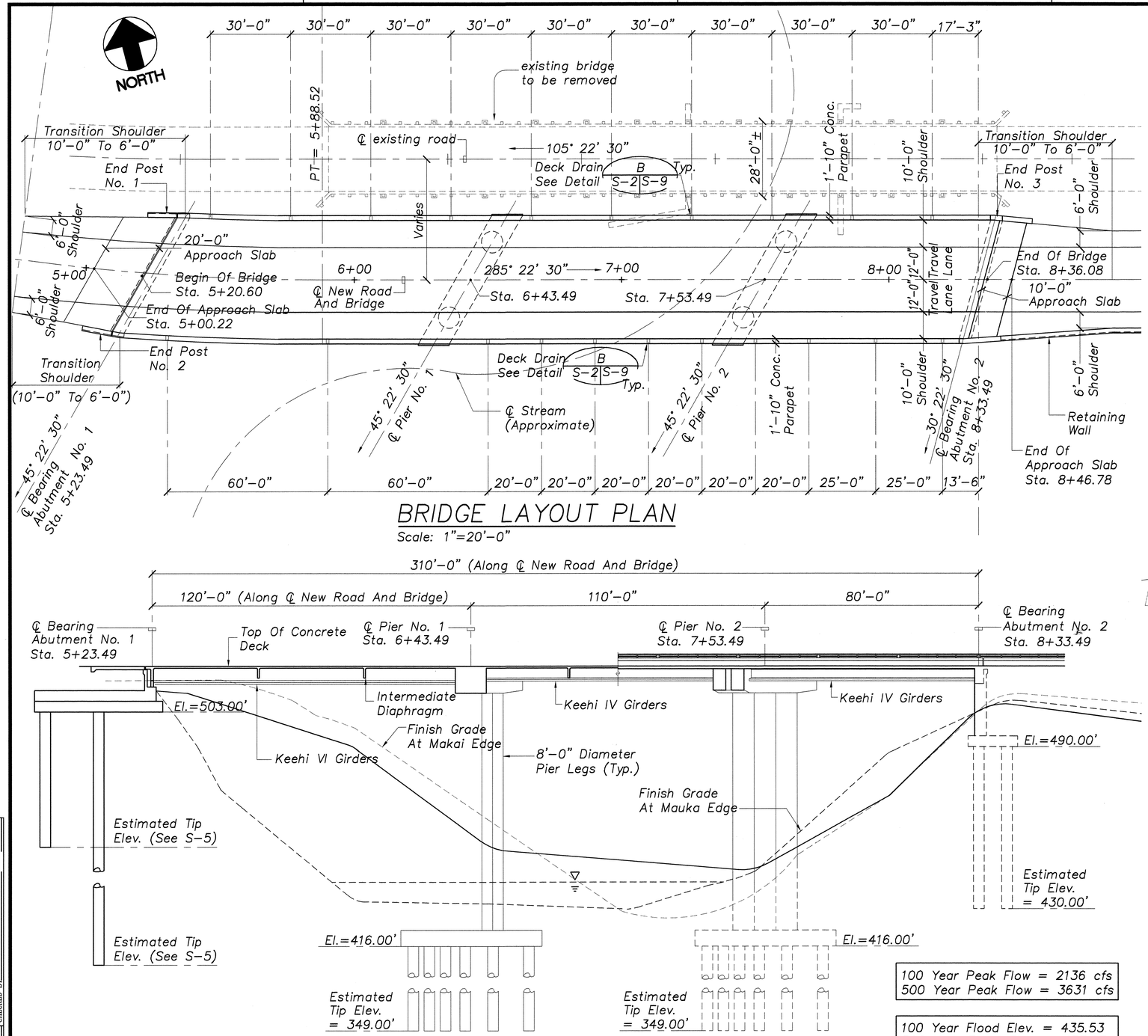
HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal–Aid Project No. BR–036–1(14)

Scale: As Noted *Date: May, 1999*

SHEET No. *S–1* OF *26* SHEETS

C.O. 46

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 47	70



BRIDGE LAYOUT PLAN

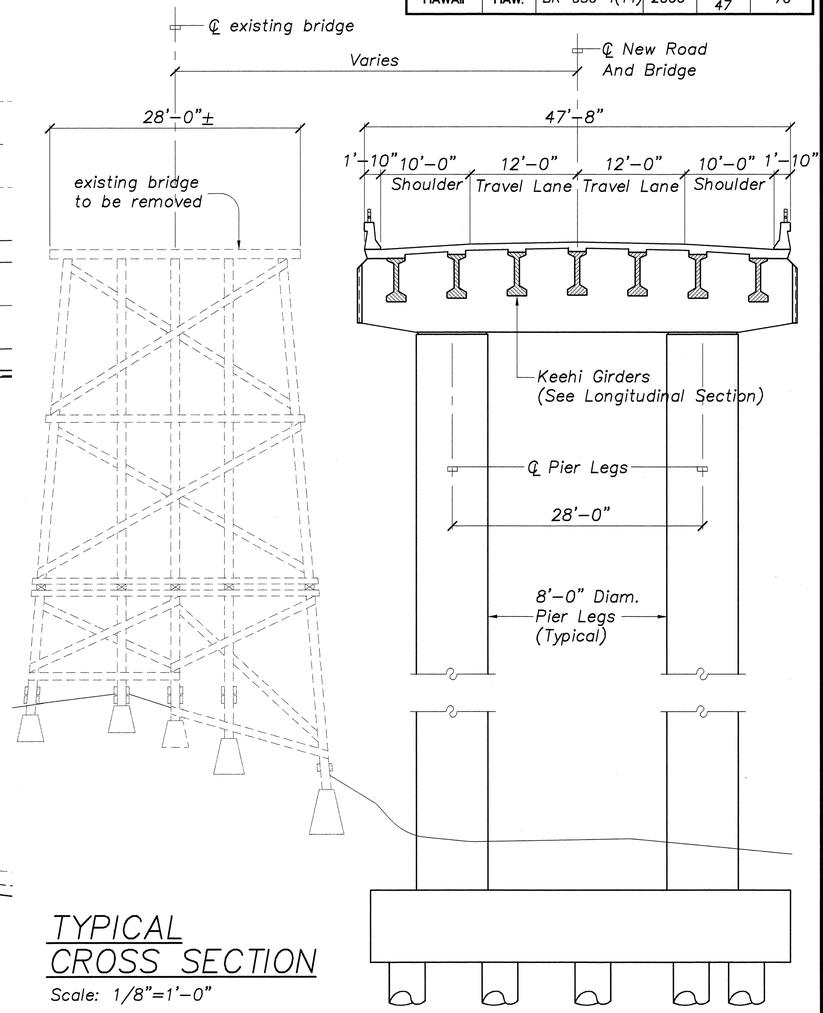
Scale: 1"=20'-0"

LONGITUDINAL SECTION / ELEVATION

Scale: 1"=20'-0"

100 Year Peak Flow =	2136 cfs
500 Year Peak Flow =	3631 cfs

100 Year Flood Elev. =	435.53
500 Year Flood Elev. =	437.27



TYPICAL CROSS SECTION

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

DATE	REVISION
7/16/02	DECK DRAIN LOCATIONS REVISED
12/18/00	ABUTMENT NO. 1 REVISED
12/11/00	ABUTMENT NO. 2 REVISED
12/4/00	PIER NO. 1 AND NO. 2 STATIONS REVISED

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

ORIGINAL PLAN
NOTE BOOK
No.

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE LAYOUT PLAN, LONGITUDINAL SECTION/ELEVATION, TYPICAL CROSS SECTION

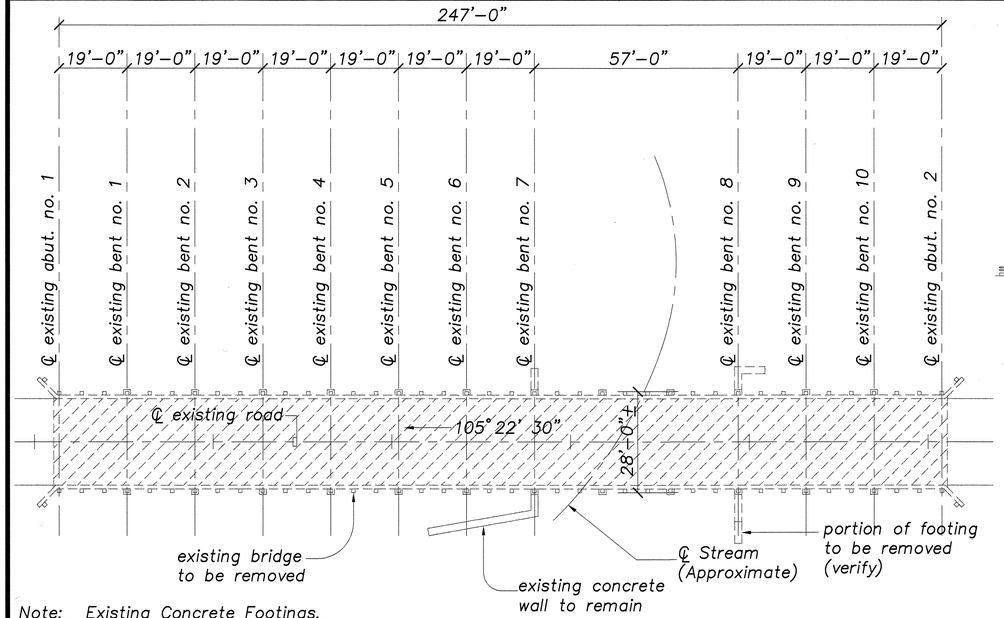
HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-2 OF 26 SHEETS

C.O. 47

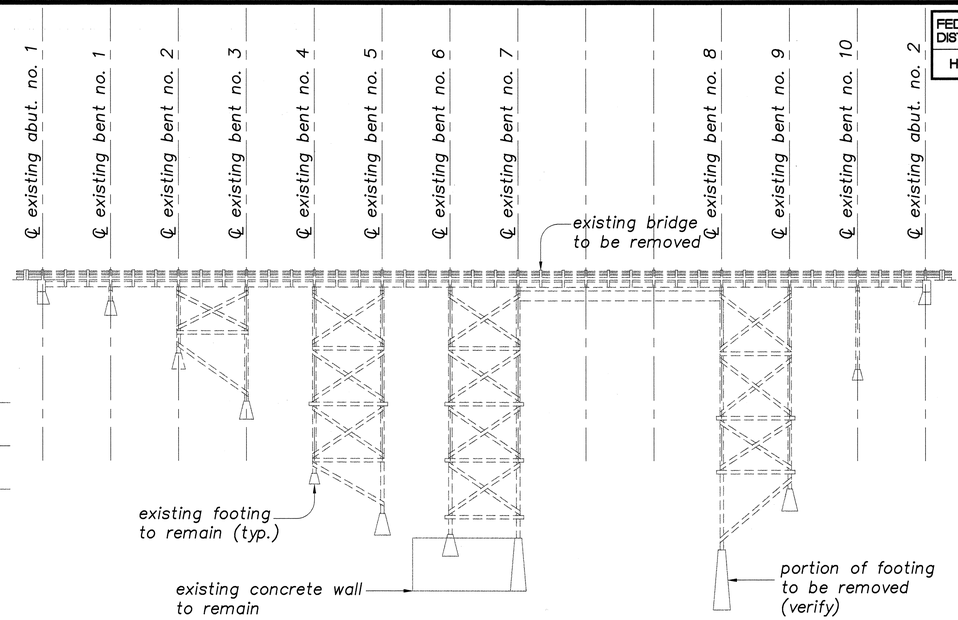
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	48	70



Note: Existing Concrete Footings, Pedestals, And Walls To Remain.

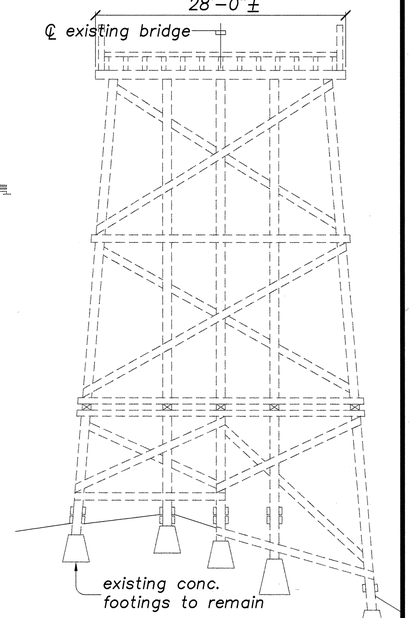
EXISTING BRIDGE PLAN

Scale: 1"=20'-0"



EXISTING LONGITUDINAL SECTION

Scale: 1"=20'-0"

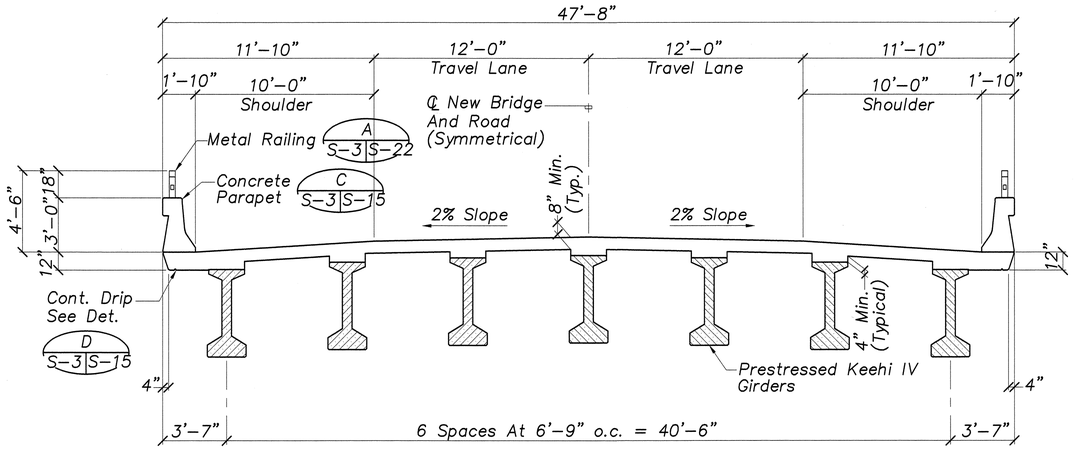


TYPICAL CROSS SECTION

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

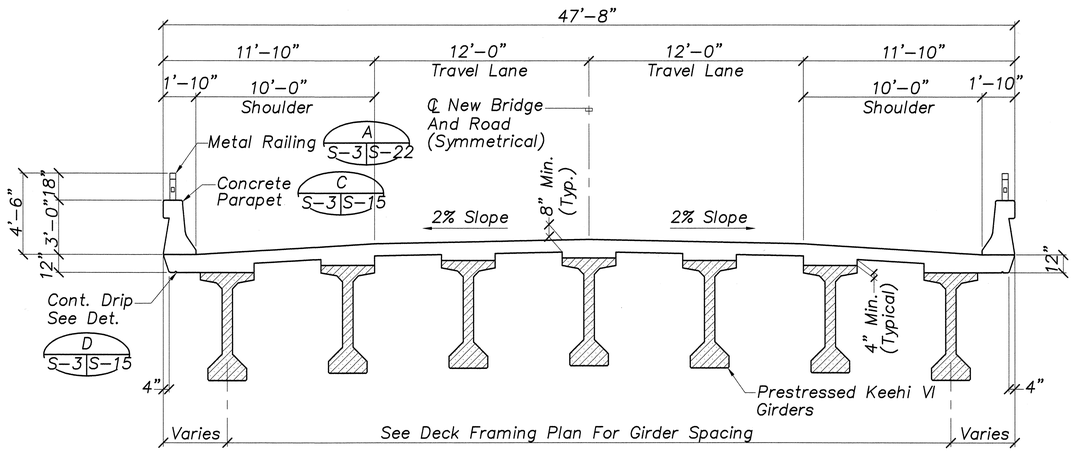
EXISTING BRIDGE DEMOLITION PLAN

Scale As Noted



NORMAL DECK SECTION AT KEEHI IV GIRDER

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



NORMAL DECK SECTION AT KEEHI VI GIRDER

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	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.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

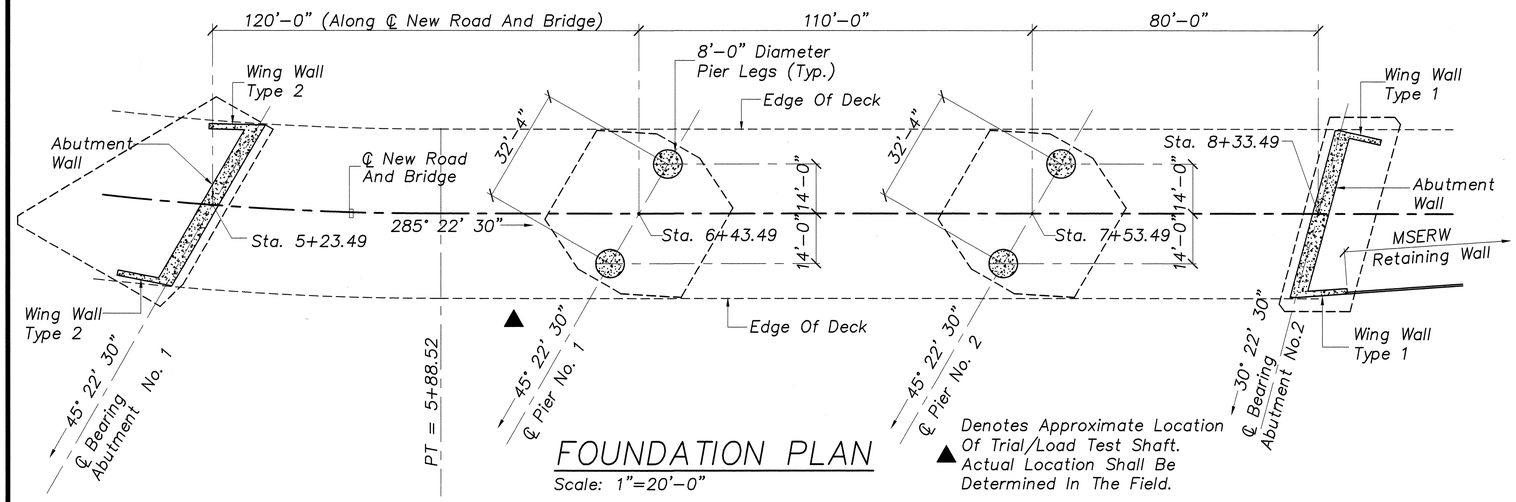
EXISTING BRIDGE DEMOLITION PLAN, NORMAL DECK SECTIONS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-3 OF 26 SHEETS

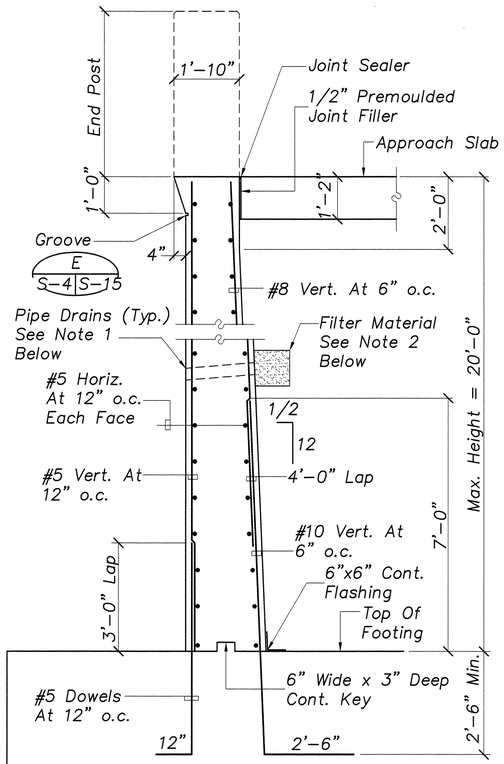
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 49	70



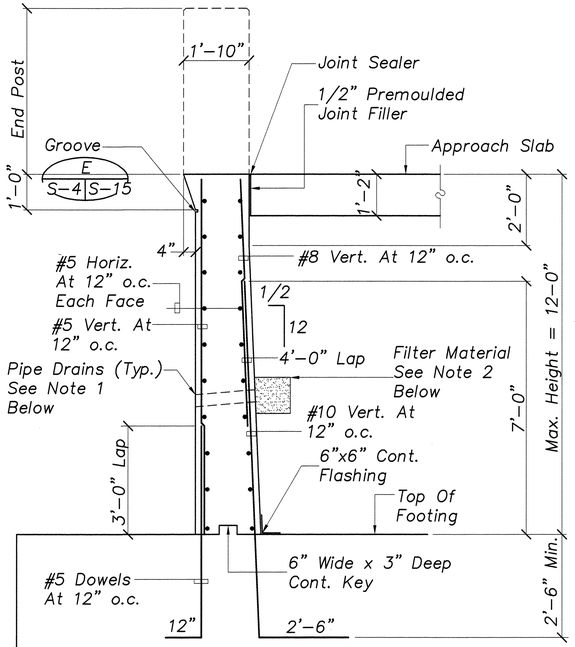
FOUNDATION PLAN

Scale: 1"=20'-0"

▲ Denotes Approximate Location Of Trial/Load Test Shaft. Actual Location Shall Be Determined In The Field.



WING WALL TYPE 1

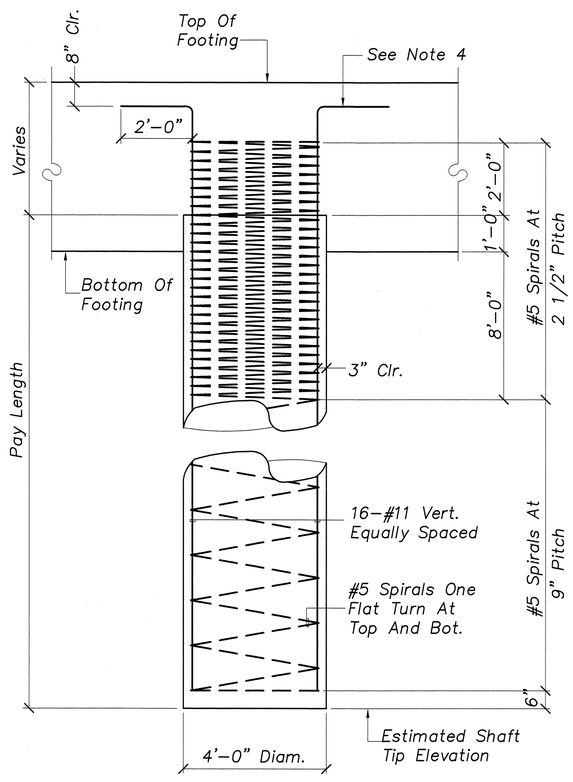


WING WALL TYPE 2

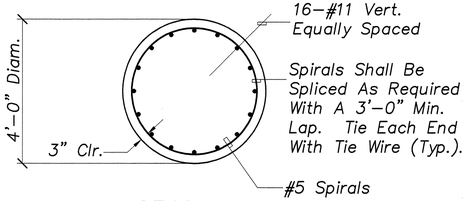
Notes:
1. Provide 4" Diameter PVC Pipe Drains At 5'-0" o.c. Maximum At 1'-0" Above Finish Grade In Abutment And Wing Walls. Adjust Horizontal Bars To Clear Drains.
2. Provide 12"x12"x12" Filter Material Wrapped With Filter Fabric At All Pipe Drains.

WING WALL DETAILS

A S-5, S-6, S-8, S-21 | S-4 Scale: 1/2"=1'-0"



ELEVATION



SECTION

Notes:
1. Drilled Shaft Concrete Shall Be 4000 PSI Strength At 28 Days.
2. Concrete Spacers Shall Be Used To Maintain The Reinforcement Cage In Position Within The Shaft.
3. Spirals May Be Discontinuous At Footing Reinforcement To Allow For Placing Footing Reinforcement. The Discontinuous Spirals Shall Be Terminated With A 135° Hook Around Vertical Reinforcement.
4. Vertical Bars With Hooked Ends Shall Be Provided At All Drilled Shafts At Abutment No. 1 And Abutment No. 2. Hooked Ends Need Not Be Provided At Pier Footings.
5. If Temporary Casing For The Drilled Shafts At Abutments No. 1 And No. 2 Are Required, Mechanical Connectors Shall Be Used For The Hooked Ends Of The Vertical Bars.

DRILLED SHAFT DETAILS

B S-5, S-8, S-10 | S-4 Not To Scale

DATE	REVISION
12/18/00	ABUTMENT NO. 1 REVISED
12/11/00	ABUTMENT NO. 2 REVISED
12/4/00	PIER NO. 1 AND NO. 2 STATIONS REVISED

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.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FOUNDATION PLAN, WING WALL DETAILS, DRILLED SHAFT DETAILS

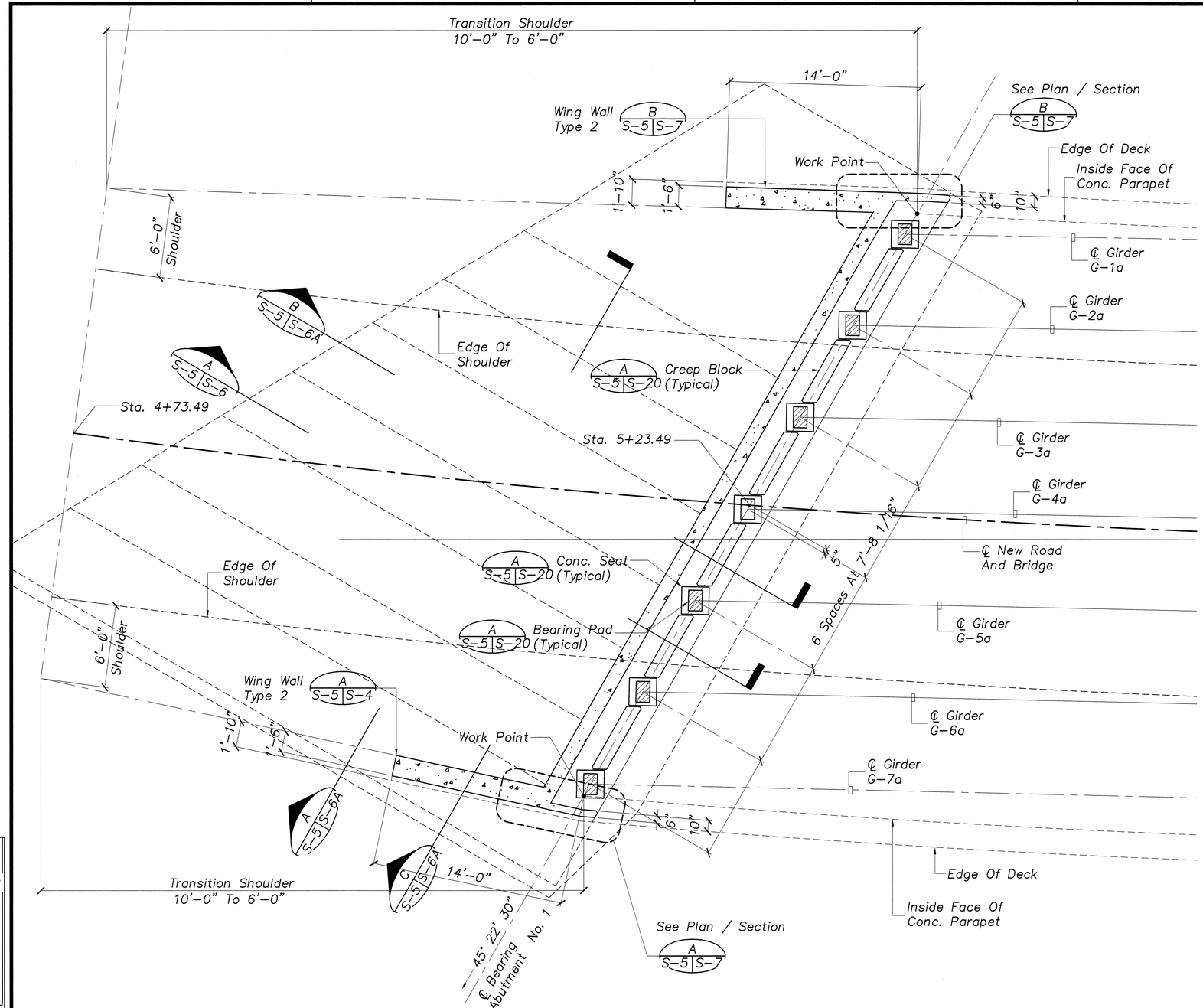
HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-4 OF 26 SHEETS

C.O. 49

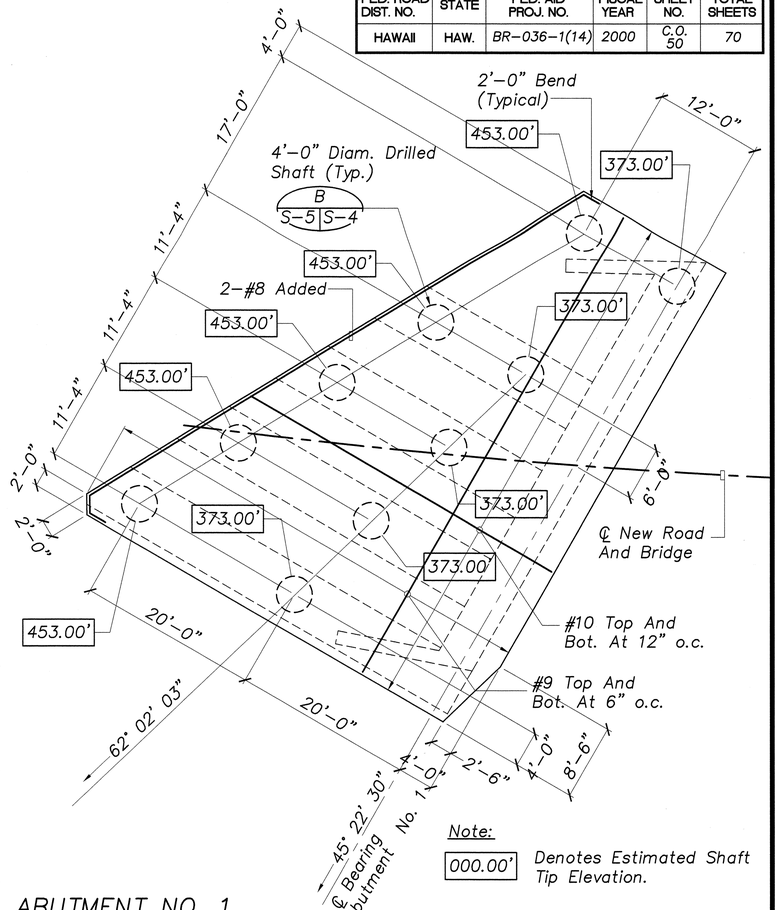
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 50	70



ABUTMENT NO. 1

PLAN AT ABUTMENT SHELF

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



Note:

000.00' Denotes Estimated Shaft Tip Elevation.

ABUTMENT NO. 1

DRILLED SHAFT LAYOUT PLAN

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

1/23/01	REVISED PLAN AT ABUTMENT SHELF
12/18/00	REVISED ENTIRE SHEET
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO. 1, PLAN AT ABUTMENT SHELF, DRILLED SHAFT LAYOUT PLAN

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-5 OF 26 SHEETS

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

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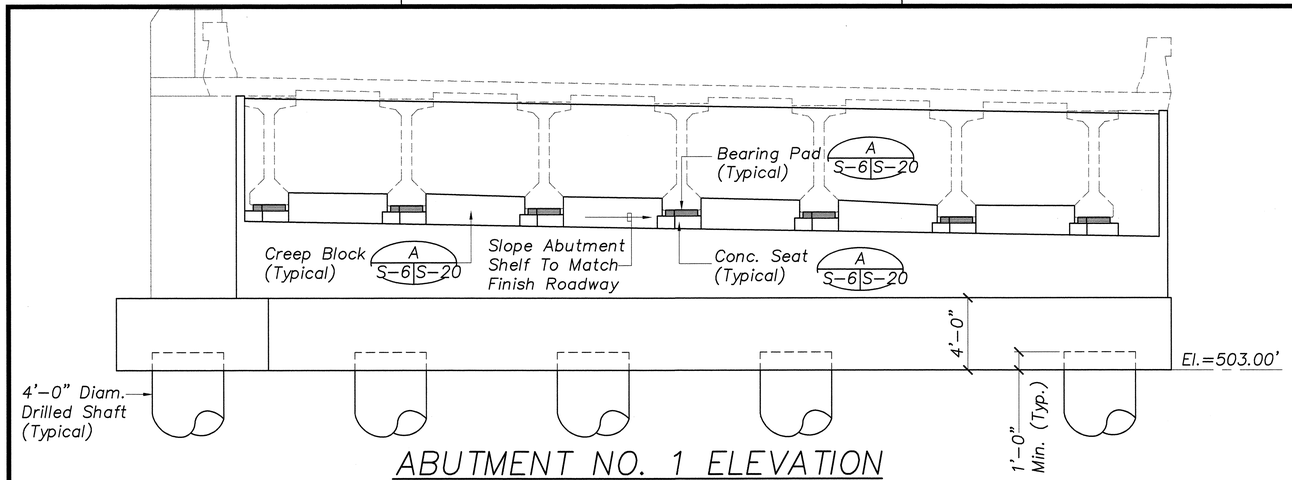
ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
NOTE BOOK
No.

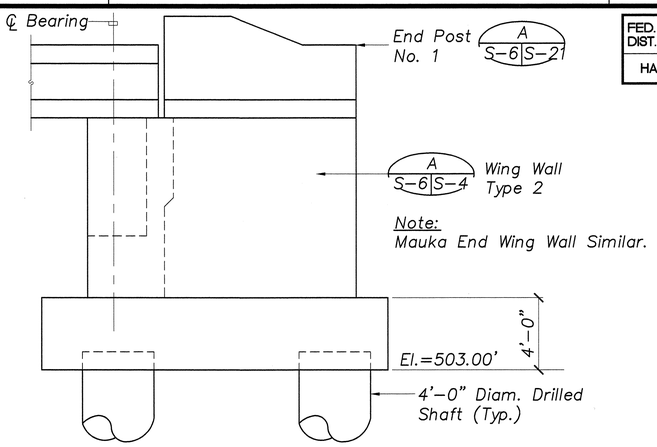
C.O. 50

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 51	70



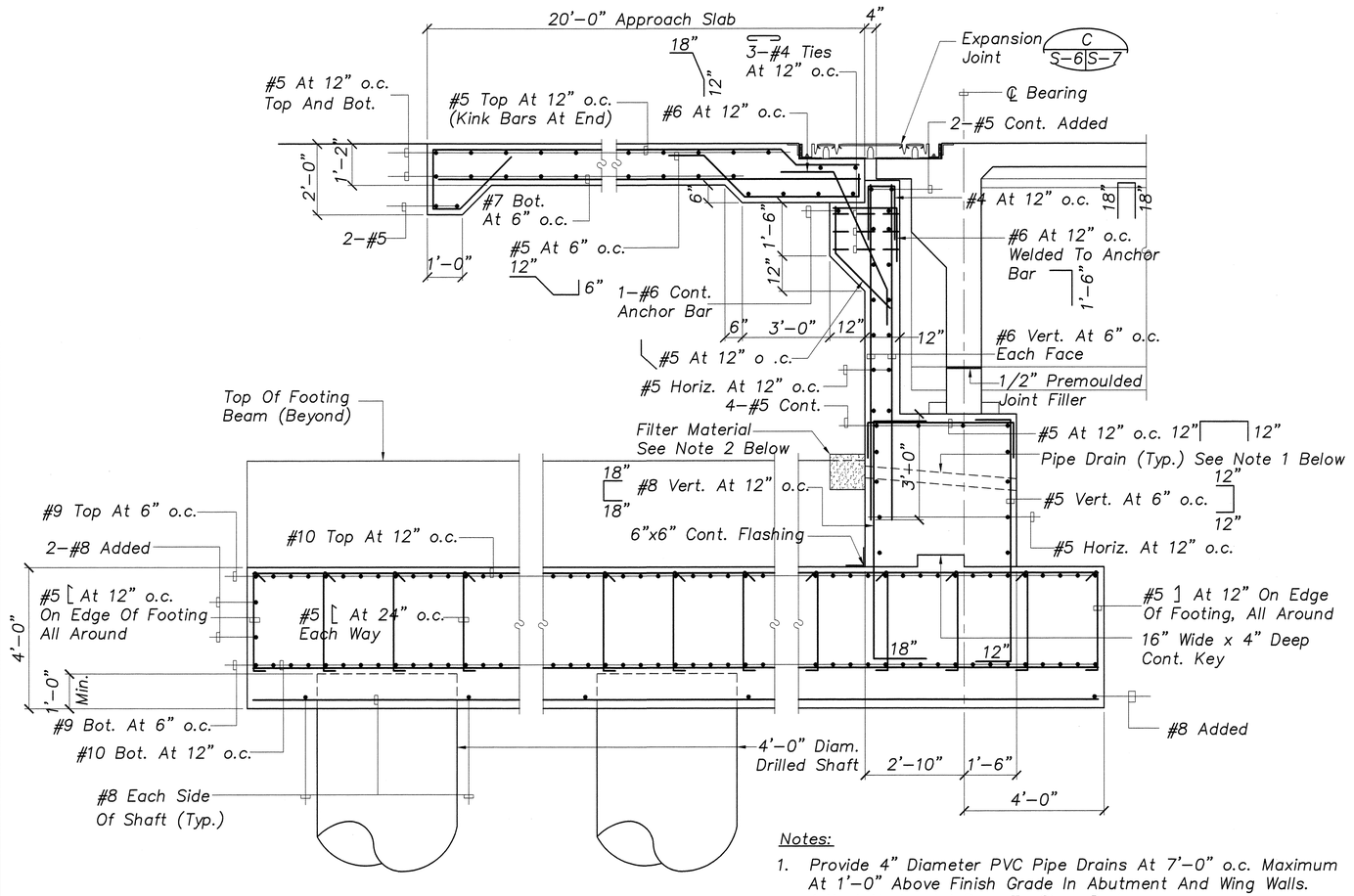
ABUTMENT NO. 1 ELEVATION

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



WING WALL ELEVATION

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



ABUTMENT NO. 1 SECTION

A S-5 S-6

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

Notes:

1. Provide 4" Diameter PVC Pipe Drains At 7'-0" o.c. Maximum At 1'-0" Above Finish Grade In Abutment And Wing Walls. Adjust Horizontal Bars To Clear Drains.
2. Provide 12"x12"x12" Filter Material Wrapped With Filter Fabric At All Pipe Drains.

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

1/23/01	REVISED ABUTMENT NO. 1 ELEVATION
12/18/00	REVISED ENTIRE SHEET
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO. 1 ELEVATION AND SECTION, WING WALL ELEVATIONS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

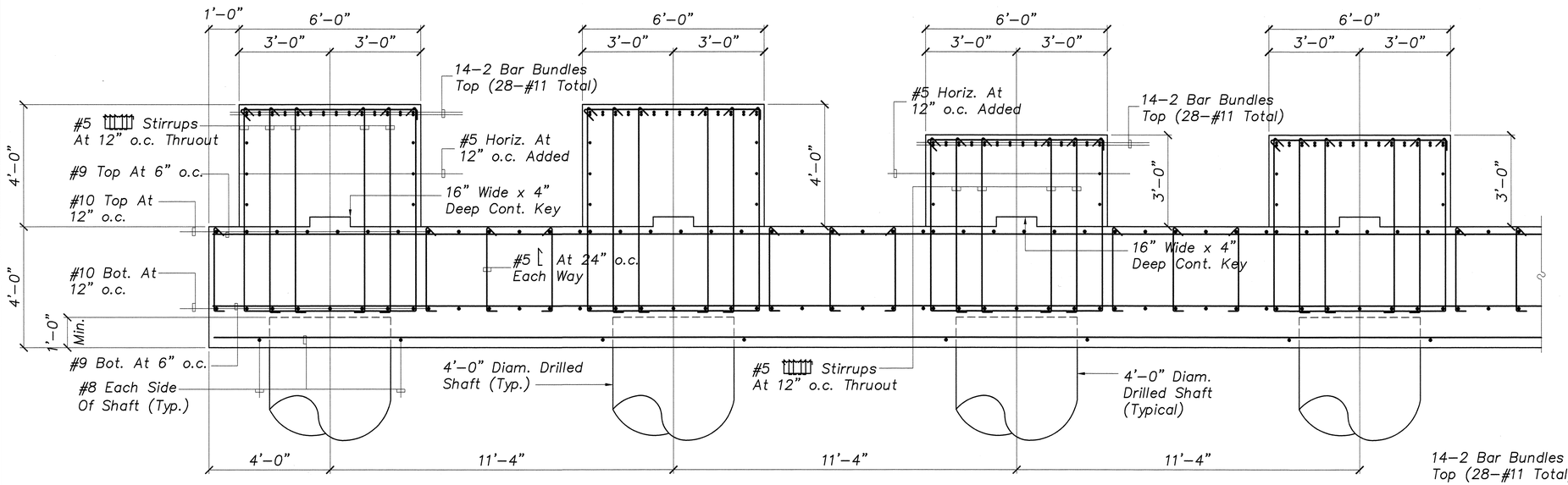
GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. S-6 OF 26 SHEETS

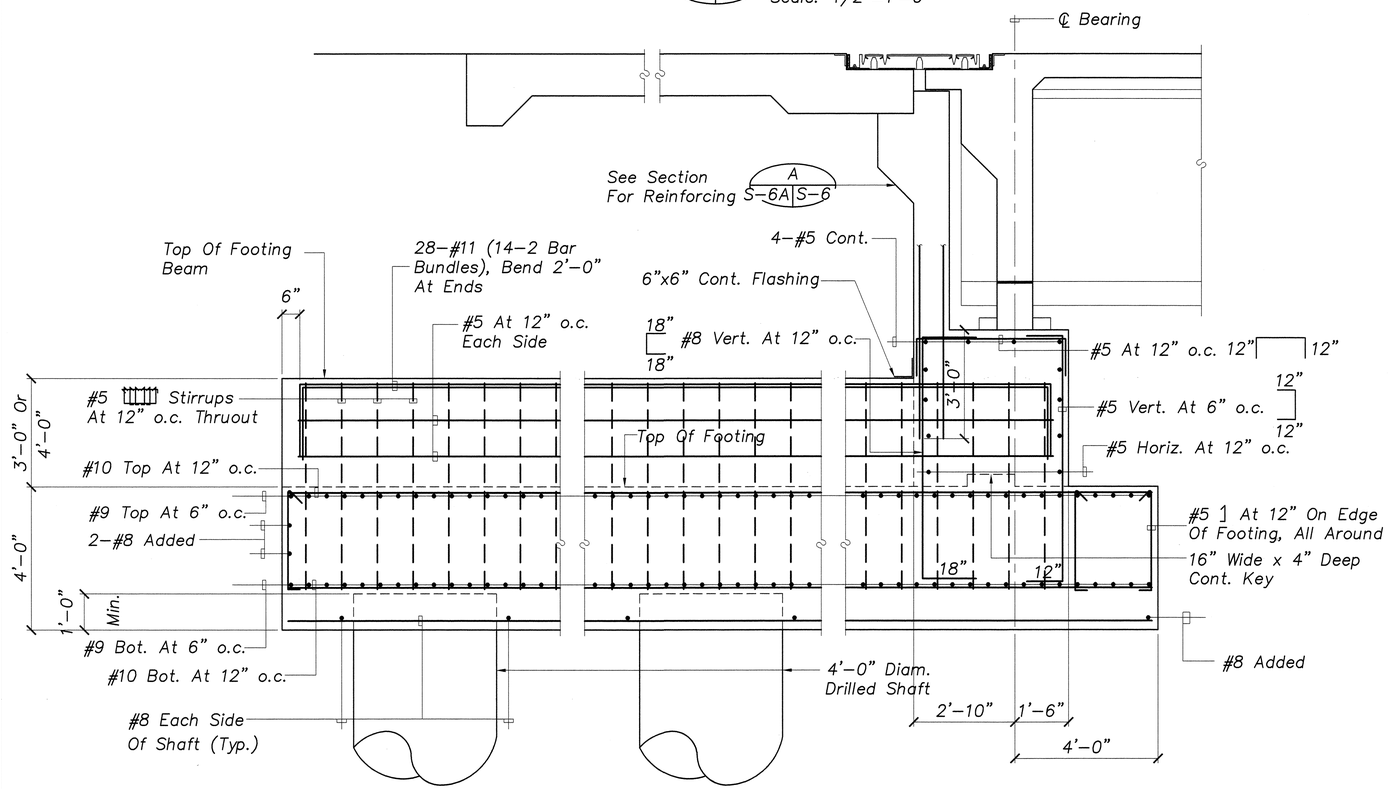
C.O. 51

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 51S-1	70



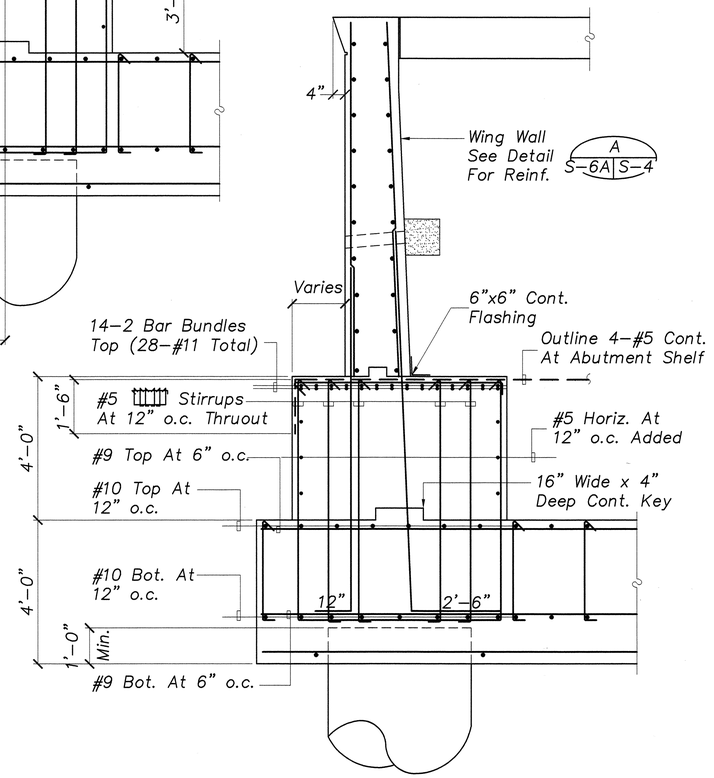
ABUTMENT NO. 1 SECTION

A S-5 | S-6A Scale: 1/2"=1'-0"



ABUTMENT NO. 1 SECTION

B S-5 | S-6A Scale: 1/2"=1'-0"



ABUTMENT NO. 1 SECTION

C S-5 | S-6A Scale: 1/2"=1'-0"

12/18/00	ADDED SHEET
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
ABUTMENT NO. 1 SECTIONS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-6A OF 26 SHEETS

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

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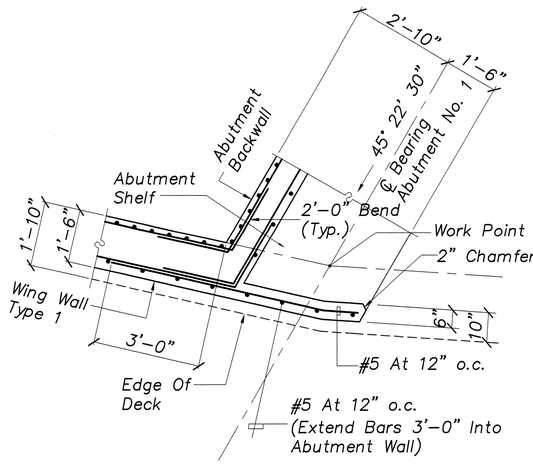
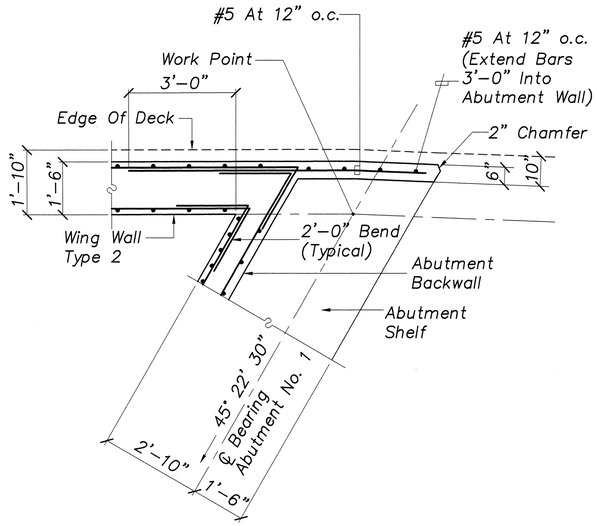
ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

C.O. 51S-1

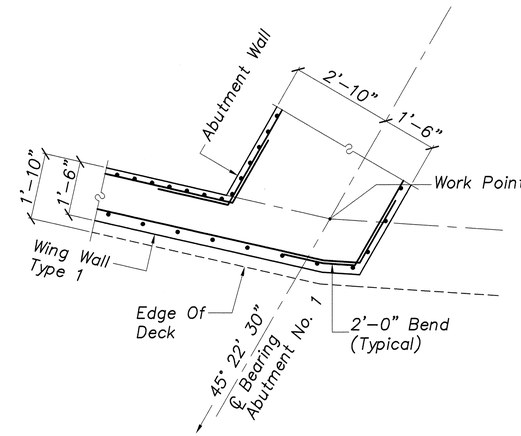
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 52	70



AT ABUTMENT SHELF



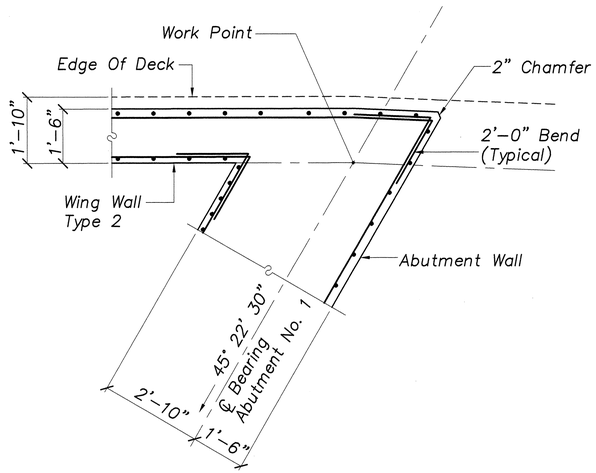
AT ABUTMENT SHELF



AT ABUTMENT WALL

A
S-5, S-8 | S-7 PLAN / SECTION

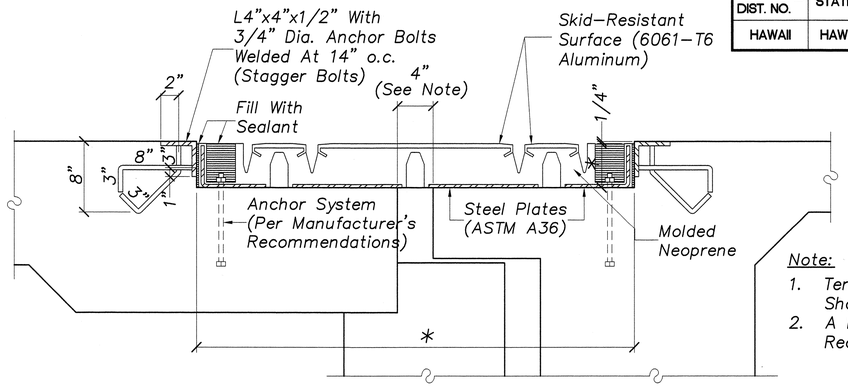
Scale: 1/2"=1'-0'



AT ABUTMENT WALL

B
S-5, S-8 | S-7 PLAN / SECTION

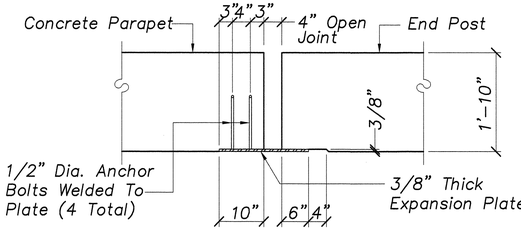
Scale: 1/2"=1'-0'



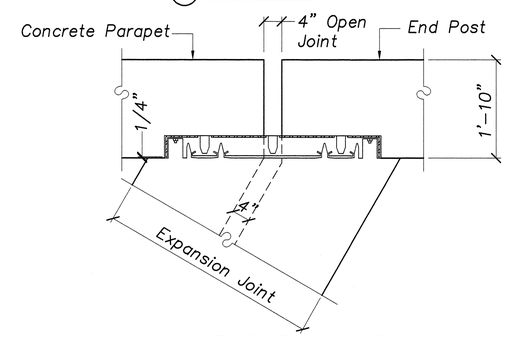
* Dimensions To Be Based On Manufacturer's Specifications.

Note:
1. Temperature At Time Of Installation Shall Be 75° F.
2. A Maximum 10 1/2" Movement Required.

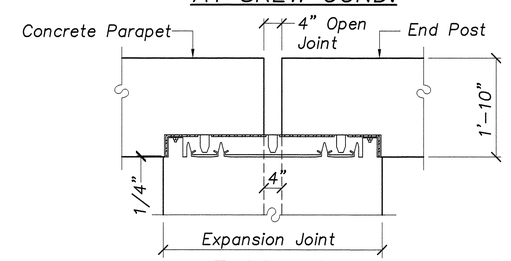
EXPANSION JOINT SECTION



A SECTION



AT SKEW COND.

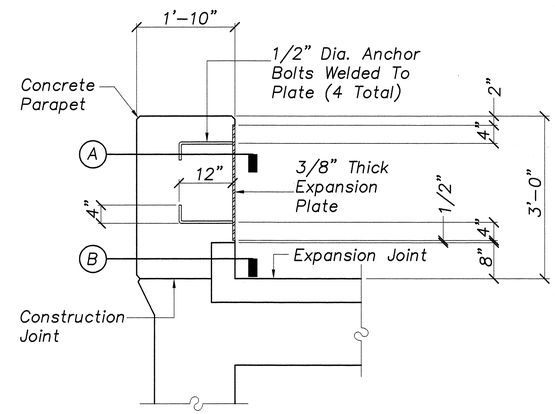


AT 90° COND.

B SECTION

C
S-6, S-9, S-19 | S-7 EXPANSION JOINT DET.

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



SECTION AT RAILING

12/21/00	ADDED "S-8" TO REFERENCE MARK ON A/S-7 AND B/S-7
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN/SECTIONS AT ABUTMENT SHELF, EXPANSION JOINT DETAIL

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

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

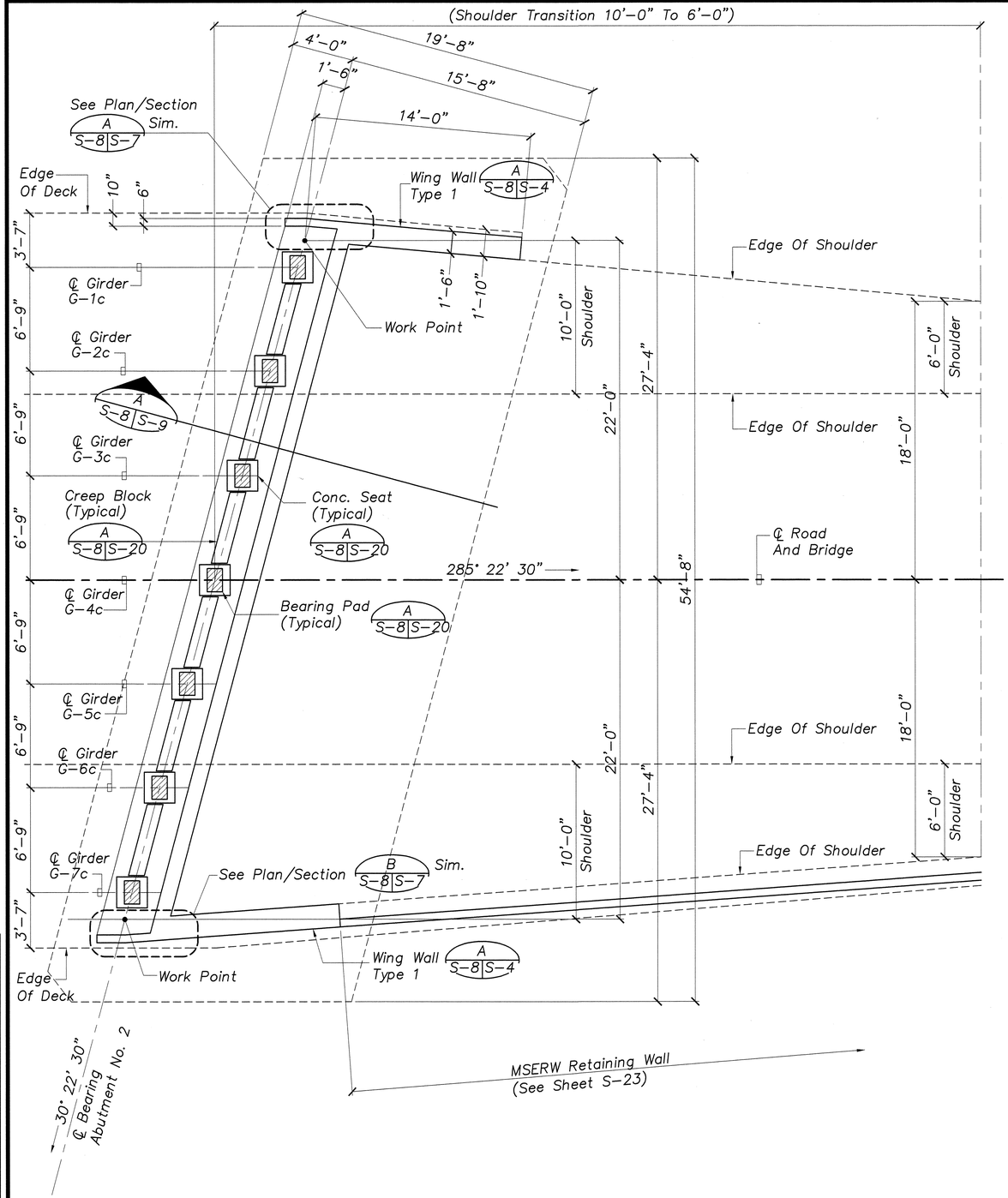
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. S-7 OF 26 SHEETS

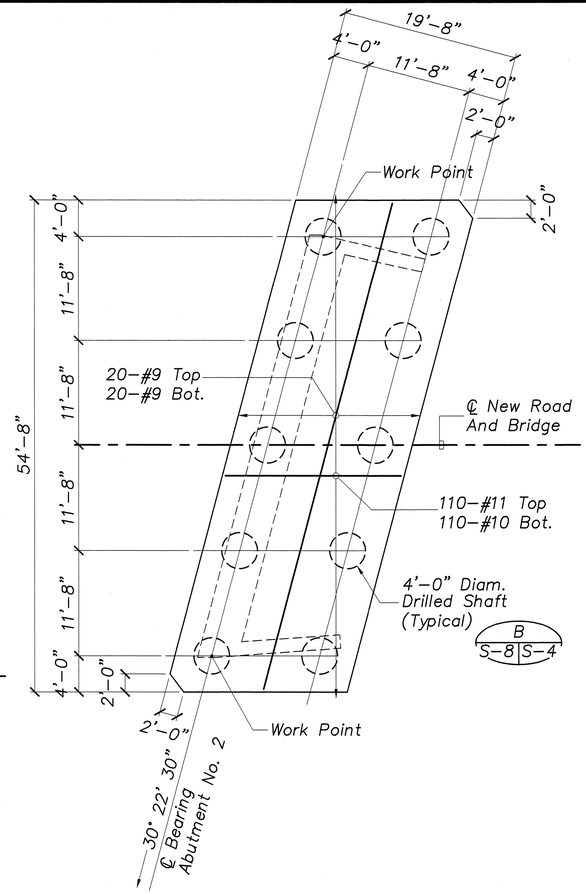
C.O. 52

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

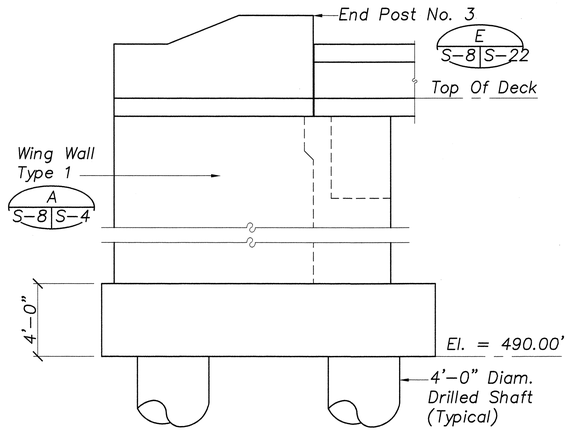
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 53	70



ABUTMENT NO. 2
PLAN AT ABUTMENT SHELF
Scale: 1/4"=1'-0"



ABUTMENT NO. 2
DRILLED SHAFT LAYOUT PLAN
Scale: 1/8"=1'-0"



WING WALL ELEVATION
Scale: 1/4"=1'-0"

DATE	REVISION
12/11/00	REVISED ENTIRE SHEET

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO. 2, PLAN AT ABUTMENT SHELF, DRILLED SHAFT LAYOUT PLAN, WING WALL ELEV.

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

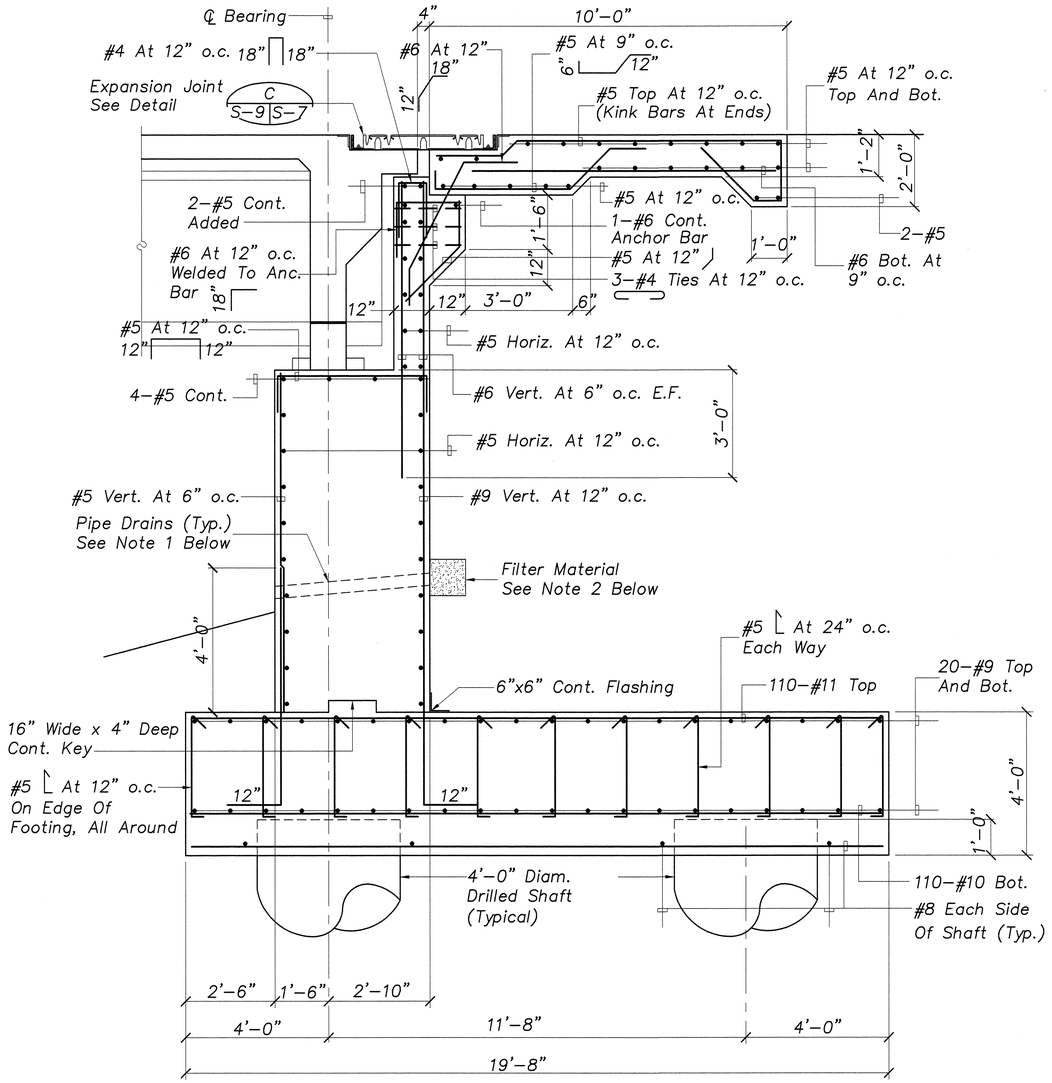
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTE BOOK
No.

SHEET No. S-8 OF 26 SHEETS

C.O. 53

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 54	70

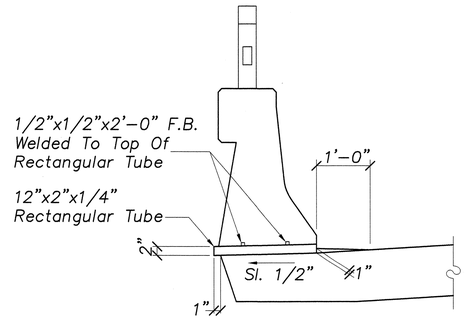


Notes:

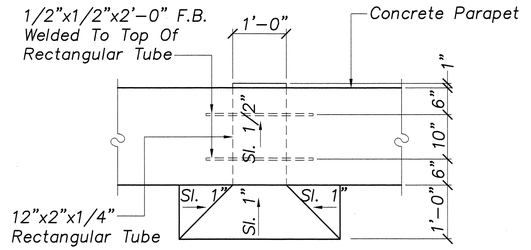
1. Provide 4" Diameter PVC Pipe Drains AT 5'-0" o.c. Maximum At 1'-0" Above Finish Grade In Abutment And Wing Walls. Adjust Horizontal Bars To Clear Drains.
2. Provide 12"x12"x12" Filter Material Wrapped With Filter Fabric At All Pipe Drains.

A S-8 S-9 ABUTMENT NO. 2 SECTION

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



SECTION



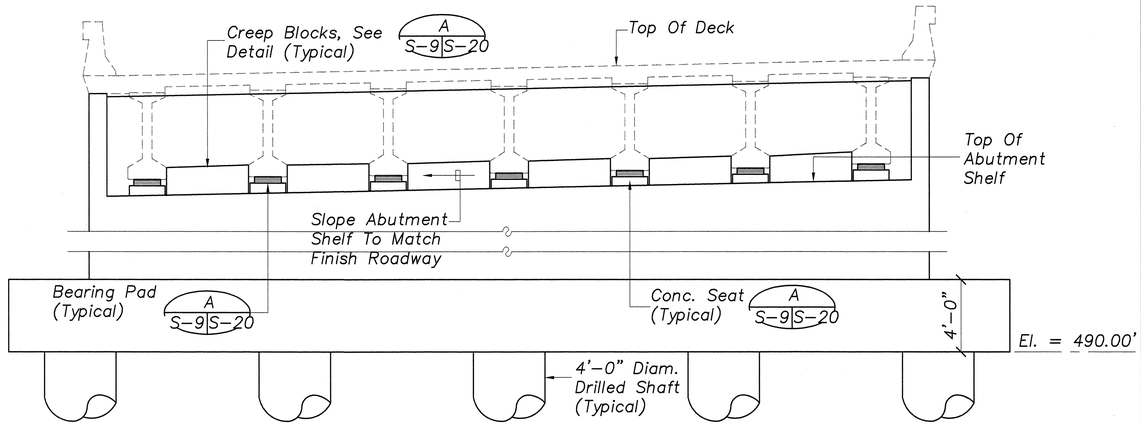
PLAN

Notes:

1. Kink deck slab top reinforcing at deck drain, as required.
2. Provide 2 sets of vertical bars (4" on center) in concrete parapet on each side of deck drain.

B S-2, S-23 S-9 TYPICAL DECK DRAIN DETAIL

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



ABUTMENT NO. 2 ELEVATION

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

1/23/01	REVISED ABUTMENT NO. 2 ELEVATION
12/11/00	ABUTMENT NO. 2 ELEVATION AND SECTION REVISED
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO. 2 ELEVATION AND SECTION

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-9 OF 26 SHEETS

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

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

C.O. 54

GENERAL NOTES

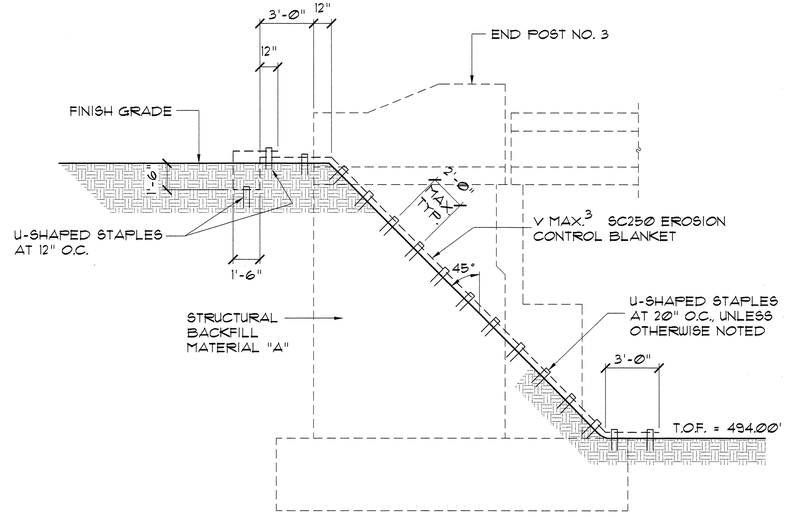
1. MATERIALS:
   - A. GEOWEB WALL SECTIONS (GW30V) SHALL BE 6–INCHES DEEP AND HAVE A NONPERFORATED WALL FACE AND PERFORATED INTERIOR CELLS. THE COLOR OF THE WALL FACE SHALL BE APPROVED BY THE ENGINEER. THE GEOWEB WALL SECTIONS (GW30V) SHALL BE AS SUPPLIED BY PRESTO PRODUCTS COMPANY OR AN APPROVED EQUIVALENT.
   - B. GEOSYNTHETIC REINFORCEMENT SHALL BE "STRATAGRID 300" AS SUPPLIED BY STRATA SYSTEMS, INC. OR AN APPROVED EQUIVALENT.
   - C. EROSION CONTROL BLANKET SHALL BE "VMAX3 SC250" AS SUPPLIED BY NORTH AMERICAN GREEN OR AN APPROVED EQUIVALENT.
   - D. STAPLES FOR EROSION CONTROL BLANKET SHALL BE 11 GAUGE WIRE MINIMUM WITH A 1–INCH CROWN AND 6–INCH LEGS, AS SUPPLIED BY NORTH AMERICAN GREEN OR AN APPROVED EQUIVALENT. INSTALLATION OF THE STAPLES SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
   - E. STRUCTURE BACKFILL MATERIAL A SHALL BE AS SPECIFIED IN SECTION 703.20 – STRUCTURE BACKFILL MATERIAL OF THE HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION, 1994.

2. GEOWEB REINFORCED WALL INSTALLATION:
   - A. EXCAVATE AND SHAPE FOUNDATION SOILS TO THE GRADES, ELEVATIONS AND DIMENSIONS SHOWN ON THE DRAWINGS.
   - B. UNLESS OTHERWISE NOTED, GEOWEB SECTIONS AND GEOSYNTHETIC REINFORCEMENT INSTALLATION SHALL BE AS RECOMMENDED BY THE MANUFACTURERS.
   - C. GEOWEB INSTALLATION:
     1) EXPAND GEOWEB SECTIONS, DIMENSIONED ACCORDING TO THE CONSTRUCTION DRAWINGS INTO POSITION USING STRETCHER FRAMES, TEMPORARY STAKES OR OTHER SUITABLE METHOD TO TEMPORARILY HOLD IN PLACE. INTERLEAF OR OVERLAP EDGES OF ADJACENT SECTIONS IN EACH LAYER, ACCORDING TO WHICH SIDE WALL PROFILES ABUT. ENSURE THAT ALL ADJOINING SECTIONS ARE FLUSH AT THE JOINTS AND ADJOINING CELLS ARE FULLY STAPLED.
     2) PLACE SPECIFIED INFILL MATERIAL TO APPROXIMATELY 2–INCHES ABOVE THE CELL WALLS. COMPACT BACKFILL MATERIALS TO A MINIMUM 95% RELATIVE COMPACTION AND REMOVE EXCESS MATERIAL ABOVE THE CELL WALLS.
     3) PLACE SUBSEQUENT LAYERS WITH THE SPECIFIED SET BACK AND ALIGN GEOWEB SECTIONS TO AVOID OVERHANGING OF UPPER SECTIONS OVER LOWER SECTIONS.
     4) WHERE DIFFERENT INFILL MATERIALS ARE SPECIFIED FOR THE OUTER CELLS (TOPSOIL AND VEGETATED), THE FOLLOWING PROCEDURES MAY BE USED.
        - A) COVER OUTER CELLS WITH REMOVABLE BOARD WHILE FILLING BACK CELLS. PLACE SPECIAL INFILL IN OUTER CELLS BEFORE ADVANCING TO THE NEXT LAYER.
        - B) LEAVE OUTER CELLS OPEN BUT USE EXTRA CARE TO FILL BACK CELLS AND AVOID EXCESSIVE SPILLAGE INTO OUTER CELLS. WHERE THE SPECIFIED OUTER CELLS INFILL AND VEGETATION WILL TOLERATE IT, SOME SPILLAGE OF GRANULAR INFILL INTO THE OUTER CELLS IS ACCEPTABLE.
   - D. GEOSYNTHETIC REINFORCEMENT INSTALLATION:
     1) INSTALL GEOSYNTHETIC REINFORCEMENT BETWEEN GEOWEB SECTIONS AT THE SPECIFIED ELEVATIONS. PLACE THE LEADING EDGE OF THE GEOSYNTHETIC AT THE FRONT FACE OF THE GEOWEB SECTION TO BE PLACED AND EXTEND THE SPECIFIED LENGTH OVER THE COMPACTED BACKFILL. ENSURE THAT THE GEOSYNTHETIC REINFORCEMENT IS PLACED WITH THE HIGH STRENGTH DIRECTION PERPENDICULAR TO THE WALL FACE.
     2) THE GEOSYNTHETIC REINFORCEMENT SHALL BE CONTINUOUS IN THE LONGITUDINAL DIRECTION (FROM THE FRONT FACE OF THE GEOWEB SECTION TO THE BACK OF THE REINFORCED SOIL ZONE). NO SPLICES IN THE GEOSYNTHETIC REINFORCEMENT WILL BE PERMITTED IN THE LONGITUDINAL DIRECTION. IN THE TRANSVERSE DIRECTION, THE GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED ADJACENT TO EACH OTHER WITHOUT OVERLAPPING.
     3) PLACE AND INFILL THE NEXT GEOWEB SECTION ON TOP OF THE GEOSYNTHETIC REINFORCEMENT.
     4) MANUALLY TENSION THE GEOSYNTHETIC AND HOLD TAUT WITH TEMPORARY STAKES (OR ANY OTHER METHOD) DURING PLACEMENT OF THE SPECIFIED BACKFILL SOIL.
     5) PLACE BACKFILL MATERIAL WITHIN REINFORCED SOIL ZONE IN 10–INCH LOOSE LIFTS AND COMPACT TO A MINIMUM 95% RELATIVE COMPACTION. ENSURE THAT THE GEOSYNTHETIC REINFORCEMENT REMAINS TAUT AND IS NOT DISPLACED WHILE PLACING THE BACKFILL MATERIAL. THE BEST METHOD FOR PLACING THE BACKFILL MATERIAL IS TO START AT THE BACK OF THE GEOWEB SECTIONS AND SPREADING TOWARDS THE BACK OF THE REINFORCED SOIL ZONE. SHAPE AND COMPACT THE BACKFILL LEVEL WITH THE TOP OF THE GEOWEB SECTIONS PRIOR TO PLACING THE NEXT LAYER.
     6) PLACE AND COMPACT THE RETAINED SOILS BEHIND THE REINFORCED SOIL ZONE AS SPECIFIED IN THE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.

3. EROSION CONTROL BLANKET INSTALLATION:
   - A. PREPARE THE SOIL BEFORE INSTALLING THE BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
   - B. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 1'–6" DEEP BY 1'–6" WIDE TRENCH WITH APPROXIMATELY 2'–6" OF BLANKET EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES SPACED 12–INCHES APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 2'–6" PORTION OF BLANKET OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES SPACED 12–INCHES APART ACROSS THE WIDTH OF THE BLANKET.
   - C. ROLL THE BLANKETS DOWN THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO THE SOIL SURFACE WITH THE SPACING AS SHOWN ON THE DRAWING.
   - D. THE EDGES OF PARALLEL BLANKETS SHALL BE PLACED WITH APPROXIMATELY 2–INCHES TO 5–INCHES OVERLAP AND SHALL BE STAPLED THROUGH OVERLAPPED AREA.
   - E. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 6–INCHES OVERLAP. STAPLE THROUGH THE OVERLAPPED AREA, APPROXIMATELY 12–INCHES APART ACROSS THE ENTIRE WIDTH OF THE BLANKET.
   - F. ADDITIONAL STAPLES SHALL BE PLACED AS REQUIRED TO ENSURE THAT THE EROSION CONTROL BLANKET IS IN CONTACT WITH THE SOIL.

4. THE SOILS ENGINEER OF RECORD SHALL BE NOTIFIED TO OBSERVE THE EXCAVATION AND BACKFILL PLACEMENT FOR THE GEOWEB REINFORCED WALL.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR–036–1(14)	2000	C.O. 54S–1	70

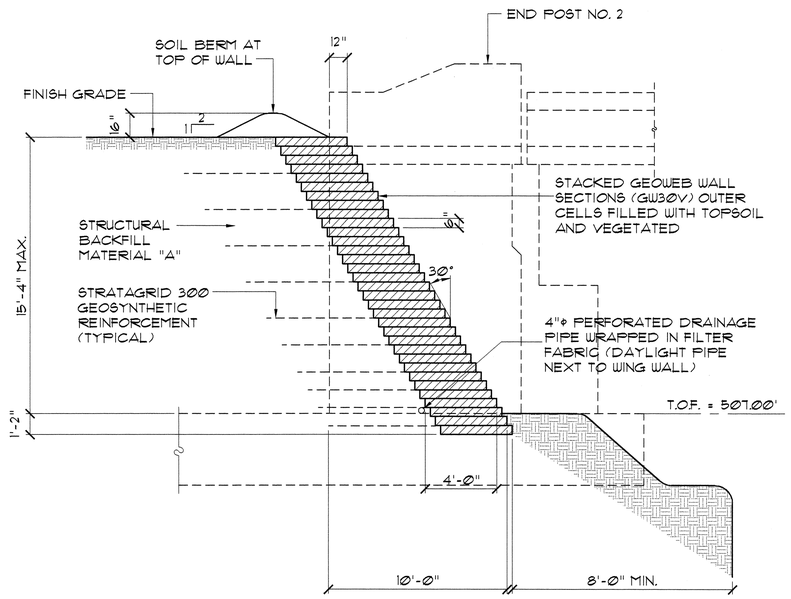


ABUTMENT NO. 2

B / S–1

SECTION AT EROSION CONTROL BLANKET

SCALE: 1/4"=1'–0"



ABUTMENT NO. 1

A / S–1

SECTION AT GEOWEB REINFORCED WALL

SCALE: 1/4"=1'–0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	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

04/30/04

Expiration Date of Professional License

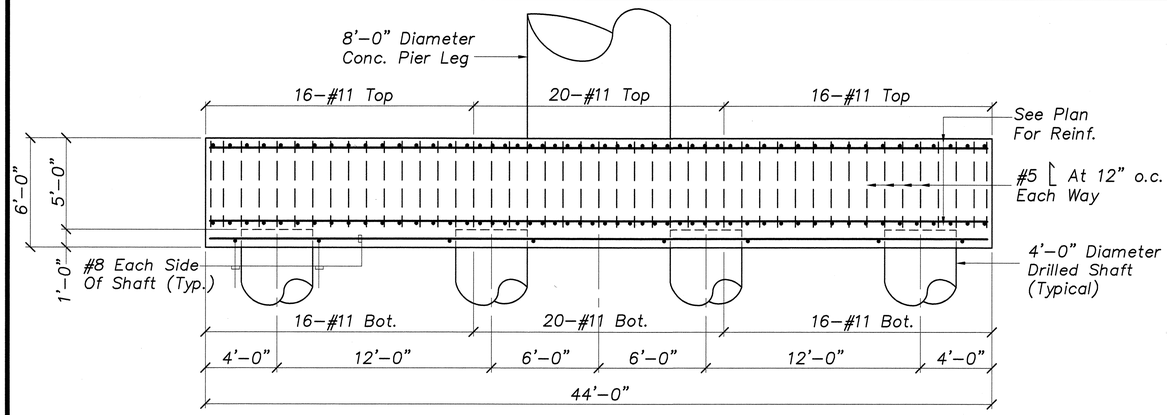
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GEOWEB REINFORCED WALL

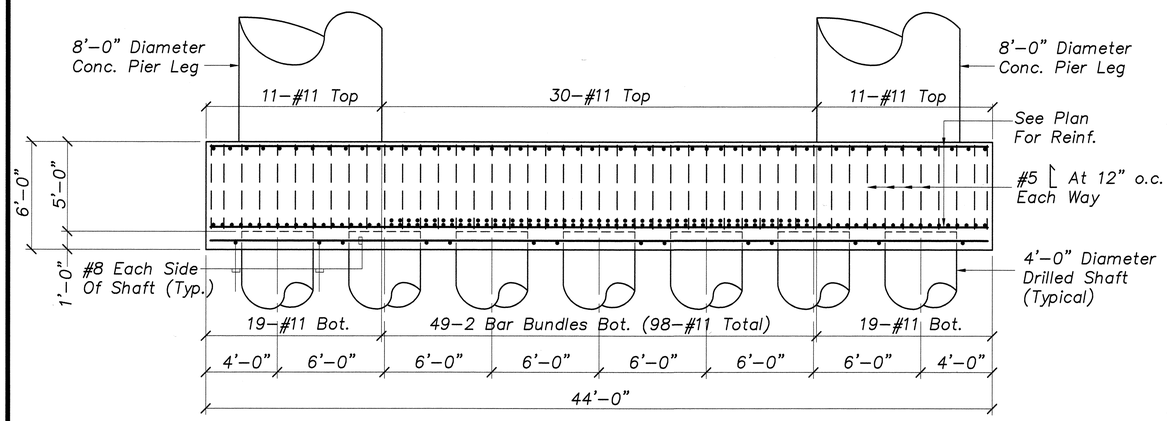
HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal–Aid Project No. BR–036–1(14)

Scale: As Noted Date: May, 2002

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	55	70



A S-10 S-10 SECTION
Scale: 1/4"=1'-0"



B S-10 S-10 SECTION
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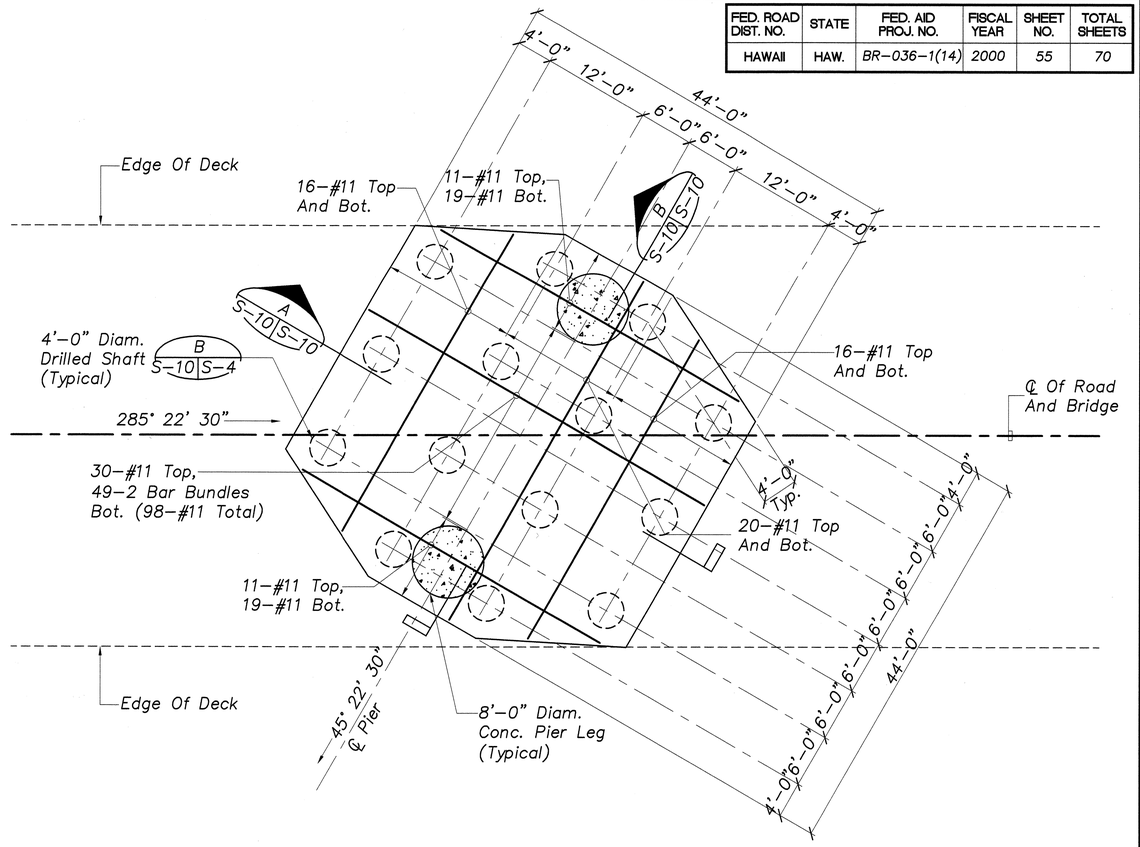


PIER FOUNDATION PLAN
Scale: 1/8"=1'-0"

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

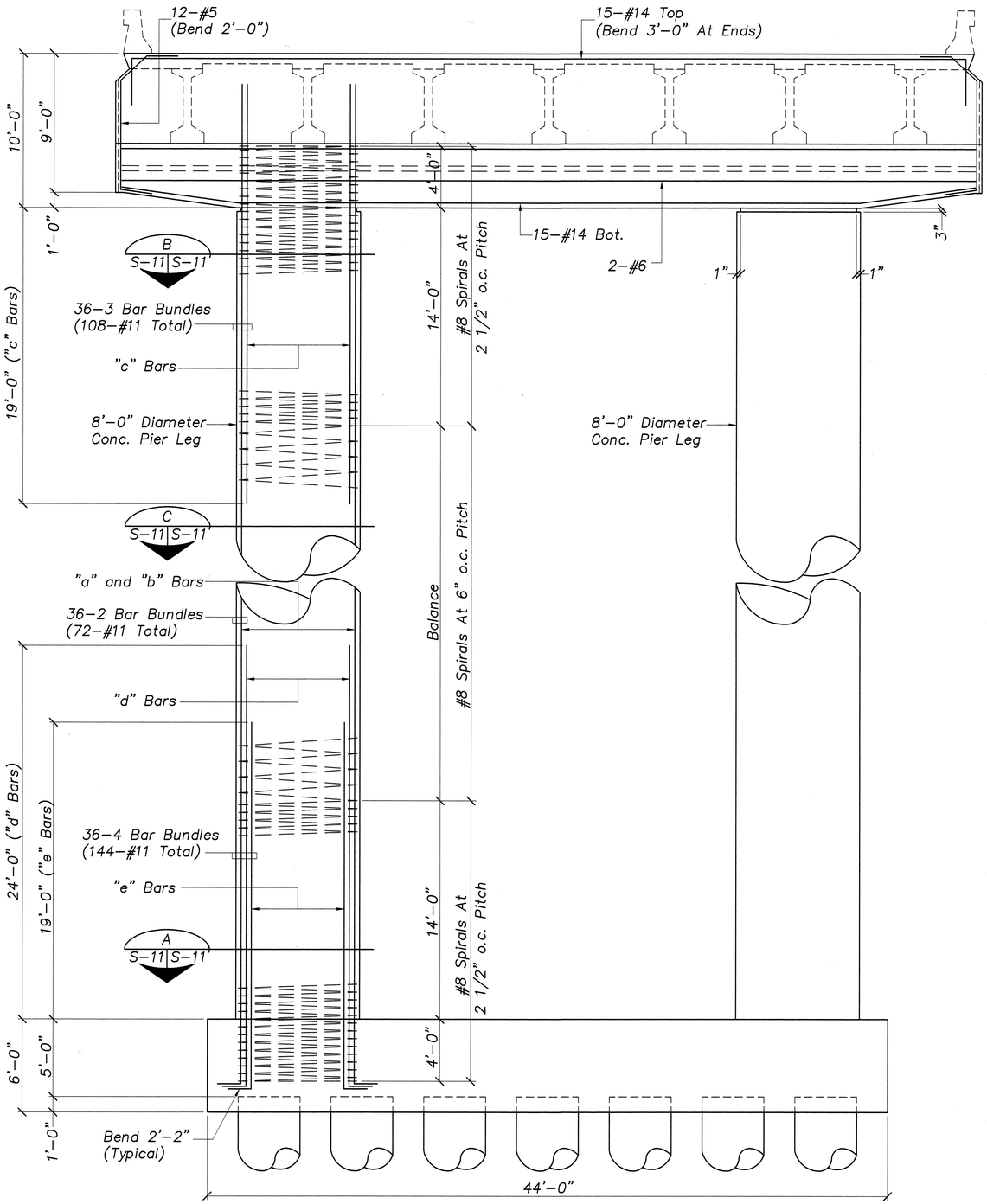
PIER FOUNDATION PLAN AND SECTIONS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-10 OF 26 SHEETS

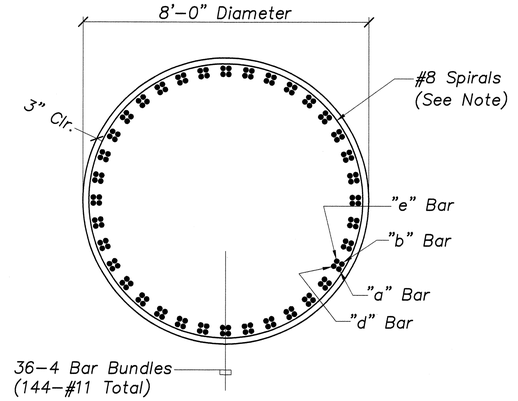
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	56	70



PIER SECTION

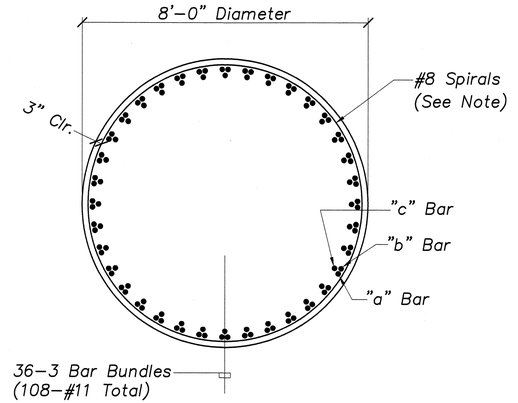
Scale: 1/4"=1'-0"

Note: Column Spirals Shall Be Spliced With Mechanical Connectors, Unless Otherwise Noted.



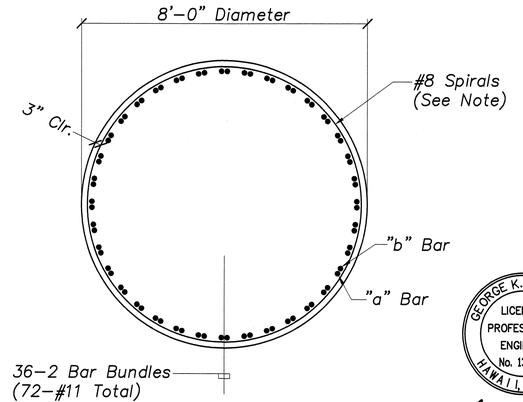
A S-11 S-11 **PIER LEG SECTION**

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



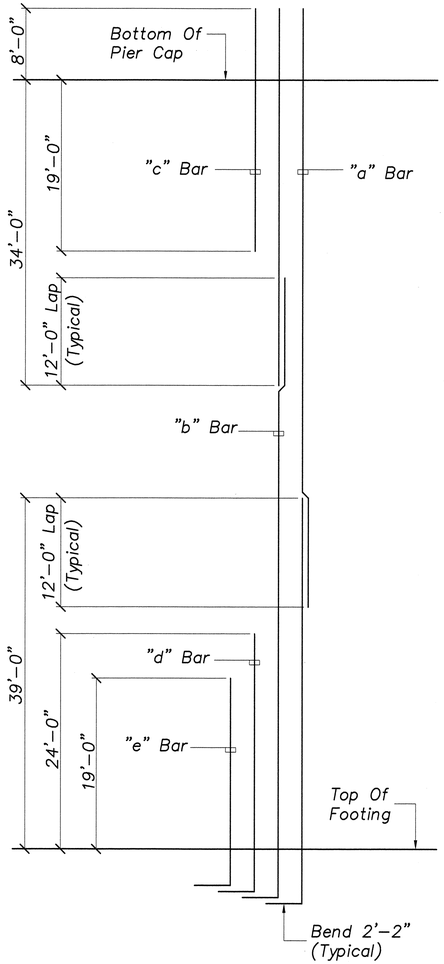
B S-11 S-11 **PIER LEG SECTION**

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



C S-11 S-11 **PIER LEG SECTION**

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



BAR LAYOUT IN PIER LEG

Not To Scale

GEORGE K. NISHIMURA
LICENSED PROFESSIONAL ENGINEER
No. 1388-S
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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PIER SECTION

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

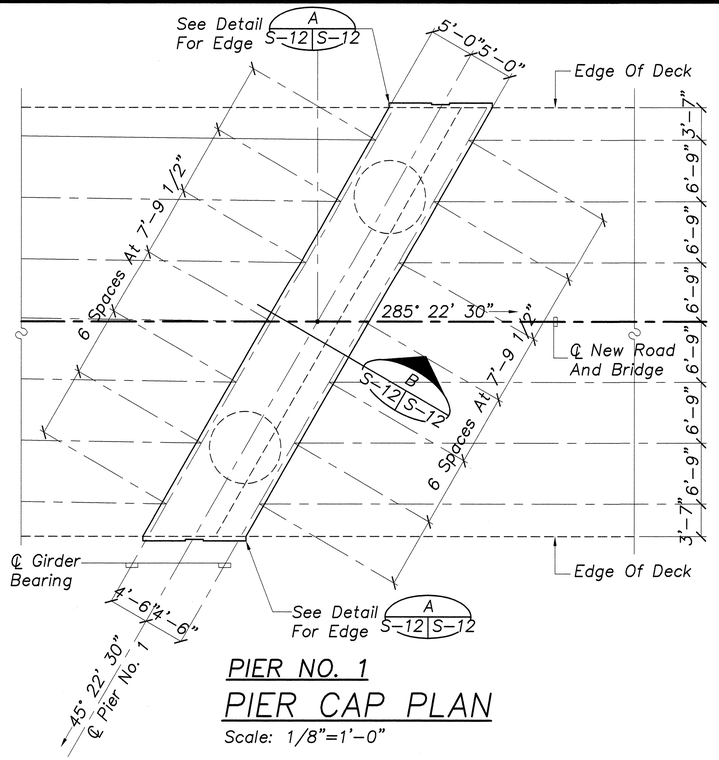
Scale: As Noted Date: May, 1999

SHEET No. S-11 OF 26 SHEETS

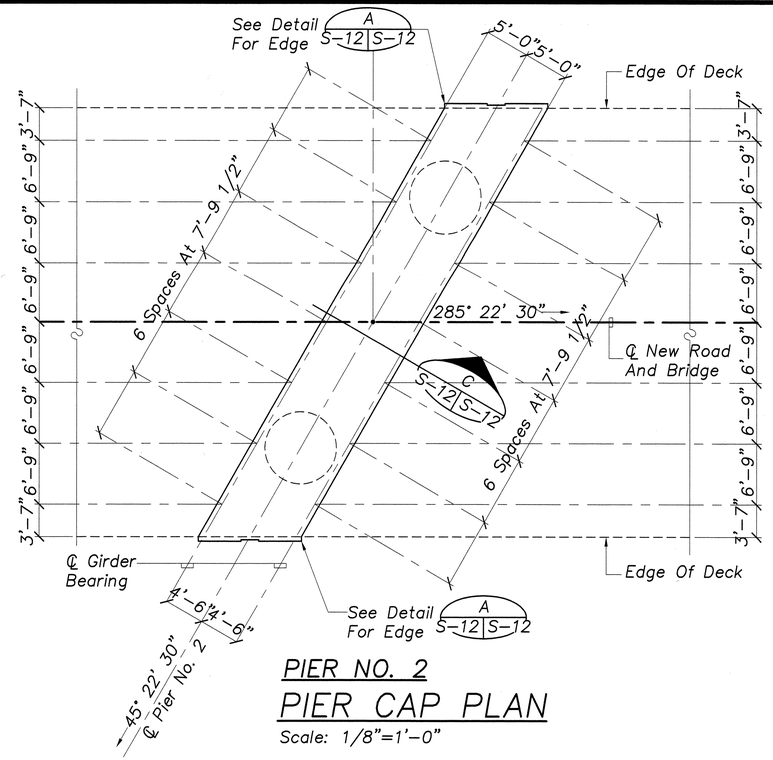
ORIGINAL PLAN
NOTE BOOK
No.

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

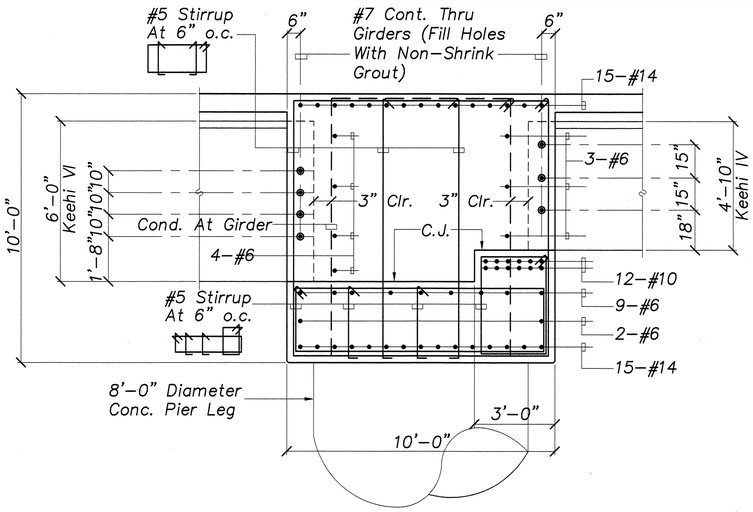
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	57	70



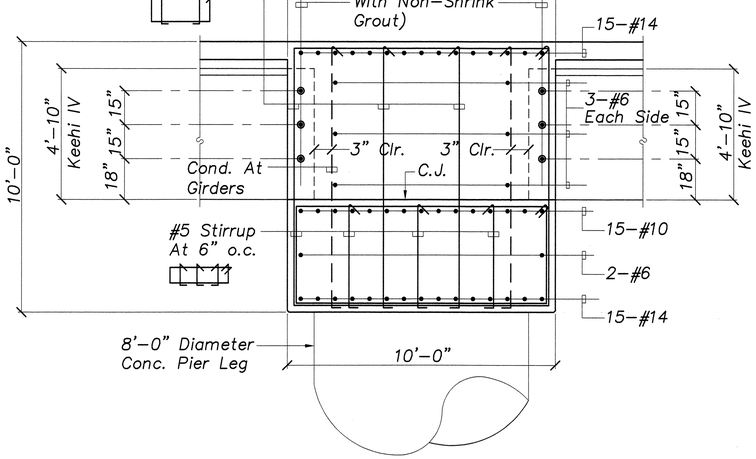
PIER NO. 1
PIER CAP PLAN
Scale: 1/8"=1'-0"



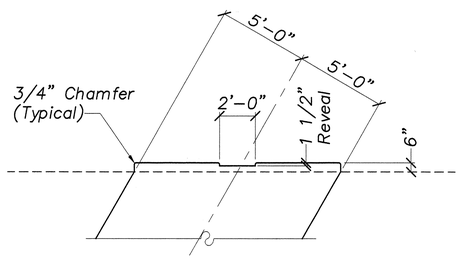
PIER NO. 2
PIER CAP PLAN
Scale: 1/8"=1'-0"



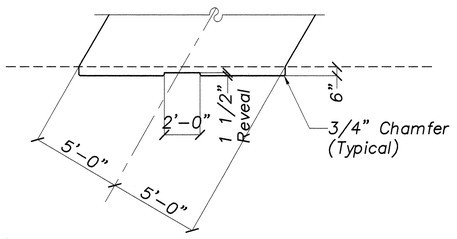
B S-12 S-12
SECTION AT PIER NO. 1
Scale: 3/8"=1'-0"



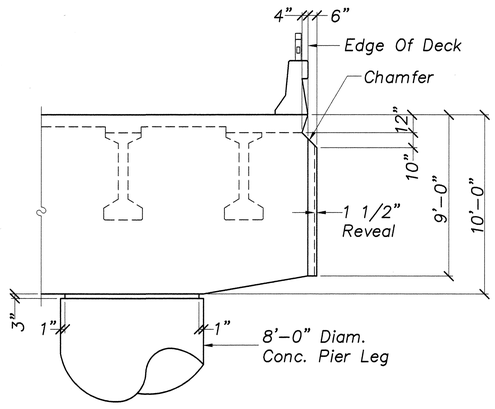
C S-12 S-12
SECTION AT PIER NO. 2
Scale: 3/8"=1'-0"



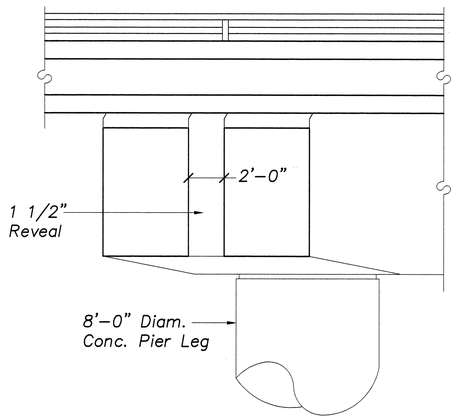
PLAN VIEW



PLAN VIEW



SECTION



ELEVATION

A S-12 S-12
PIER CAP END DETAIL
Scale: 1/4"=1'-0'

ORIGINAL PLAN BY	SURVEY PLOTTED BY	DATE
NOTE BOOK	SHOWN BY	
No.	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.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
PIER CAP PLANS, AND SECTIONS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

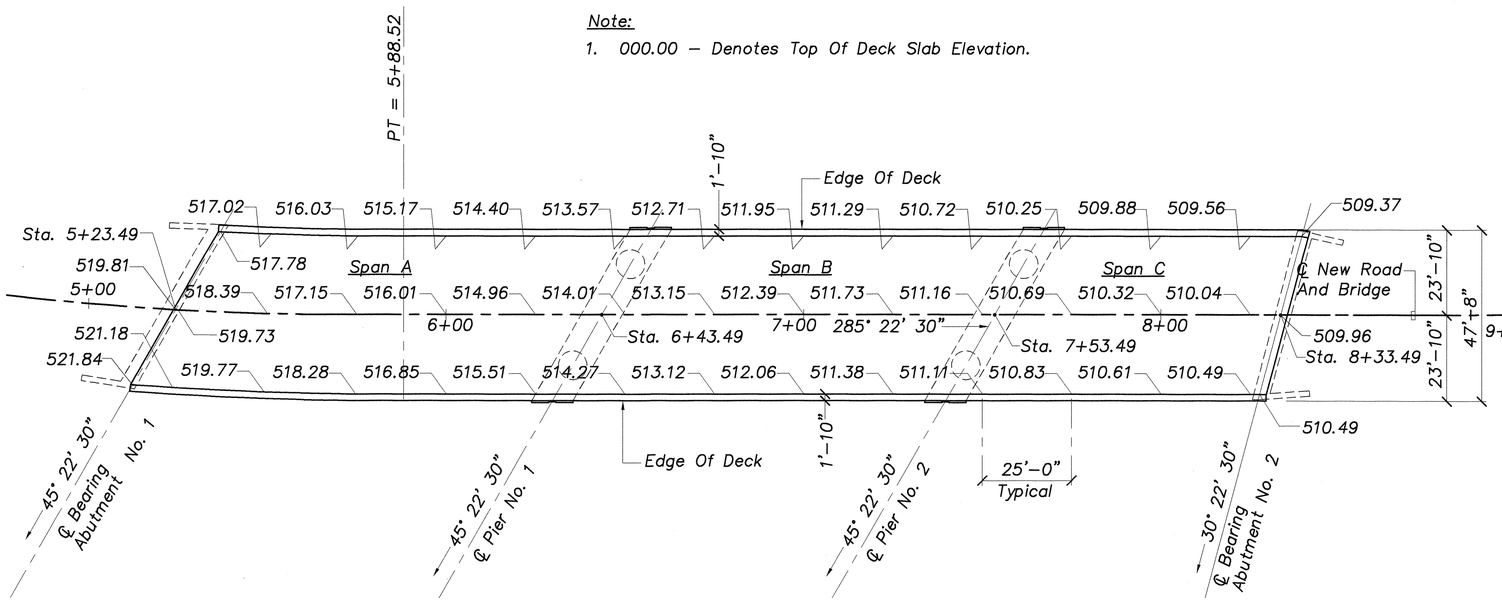
Scale: As Noted Date: May, 1999

SHEET No. S-12 OF 26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 58	70

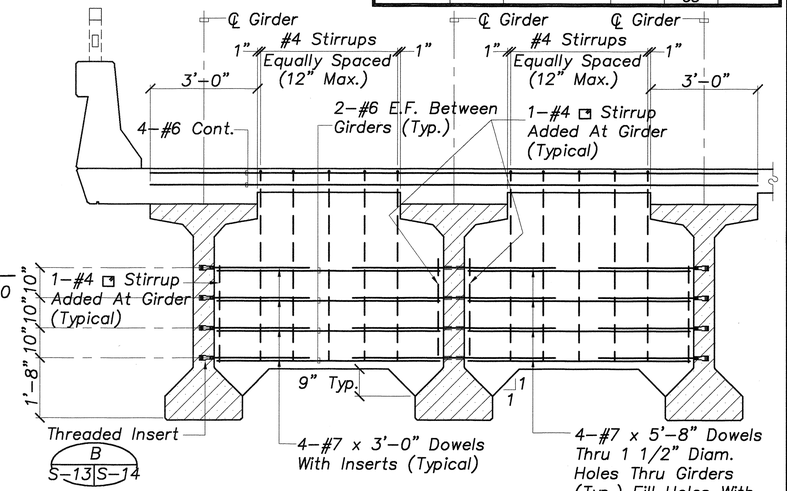
Note:

1. 000.00 – Denotes Top Of Deck Slab Elevation.



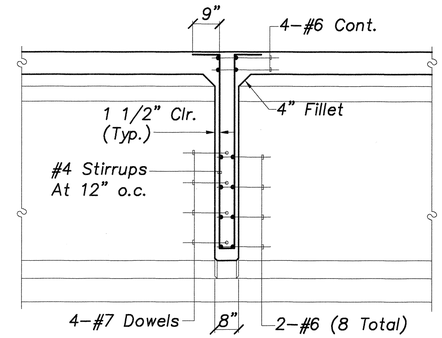
DECK LAYOUT PLAN

Scale: 1"=20'-0"



AT EXTERIOR GIRDER — AT INTERIOR GIRDER

DIAPHRAGM ELEVATION

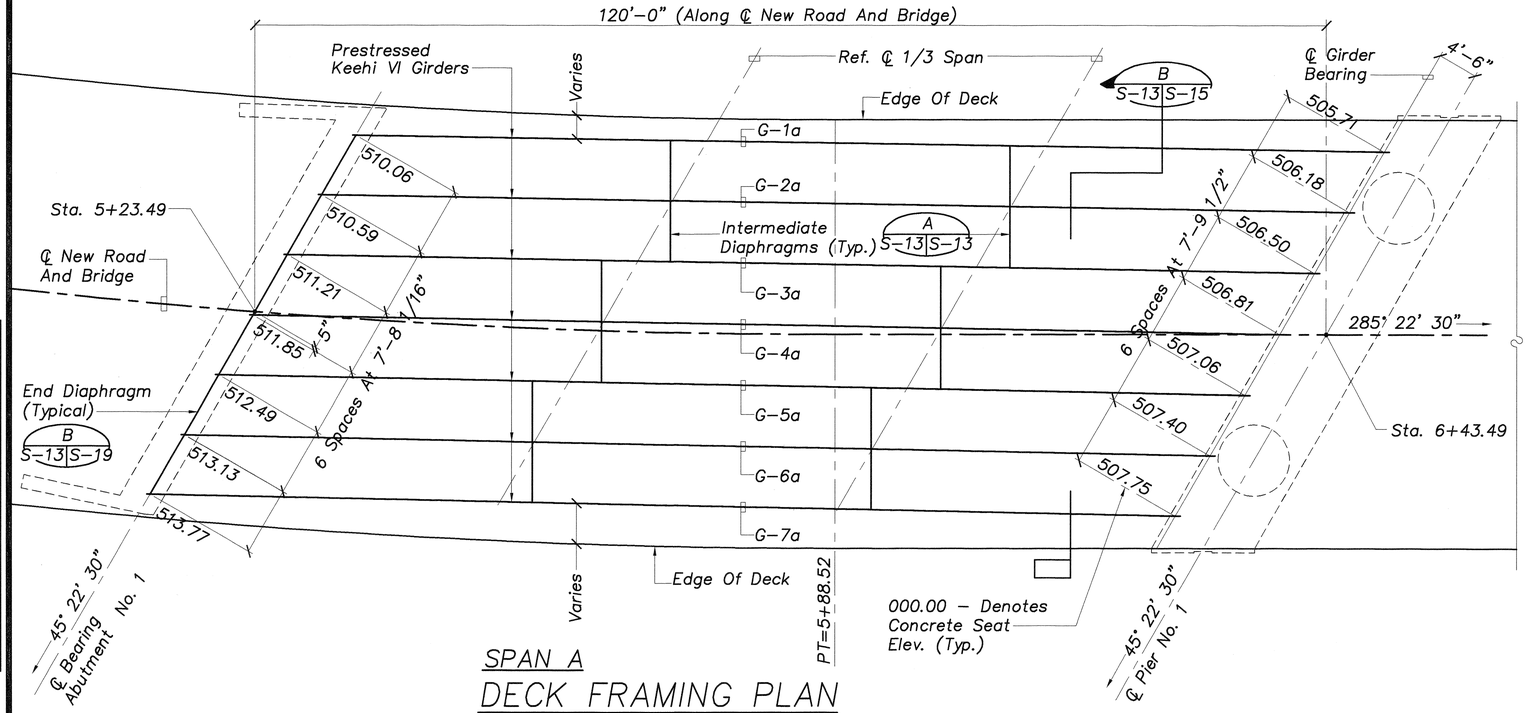


DIAPHRAGM SECTION

AT KEEHI VI GIRDER

INTERMEDIATE DIAPHRAGM DETAIL

A S-13|S-13 Not To Scale



SPAN A DECK FRAMING PLAN

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

DATE	REVISION
10/10/02	REVISED FINISH GRADES PER CORRECTIONS BY PROJECT SURVEYOR
7/16/02	REVISED DECK LAYOUT PLAN ELEVATIONS
1/23/01	REVISED DECK LAYOUT PLAN ELEVATIONS, AND DECK FRAMING PLAN SEAT ELEV.
12/21/00	ABUTMENT NO. 1 REVISED, ABUTMENT NO. 2 REVISED
12/4/00	PIER NO. 1 AND NO. 2 STATIONS REVISED

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.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DECK LAYOUT PLAN, DECK FRAMING PLAN, DIAPHRAGM DETAIL AT KEEHI VI GIRDER

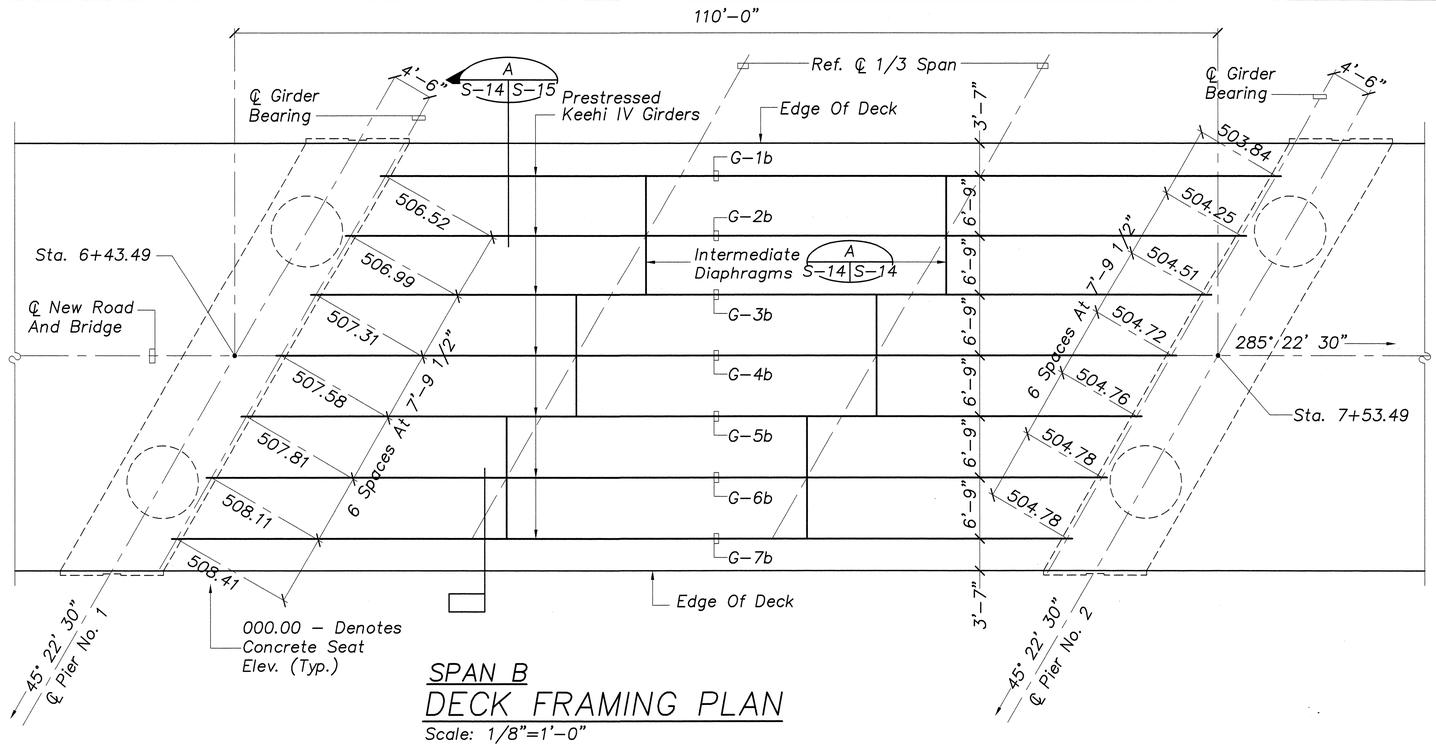
HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

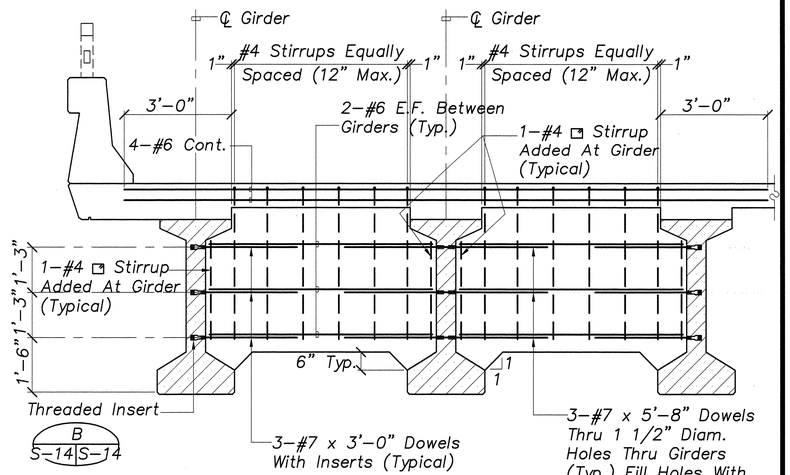
SHEET No. S-13 OF 26 SHEETS

C.O. 58

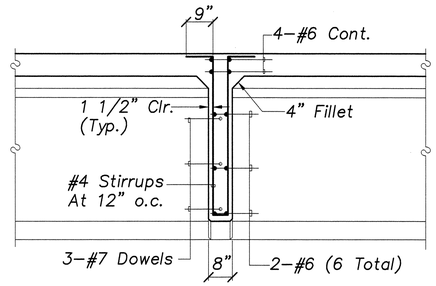
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 59	70



SPAN B
DECK FRAMING PLAN
Scale: 1/8"=1'-0"

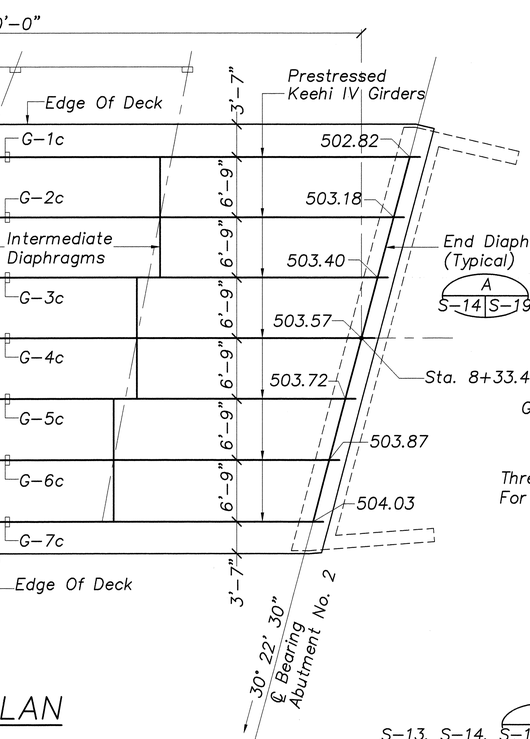


AT EXTERIOR GIRDER AT INTERIOR GIRDER
DIAPHRAGM ELEVATION

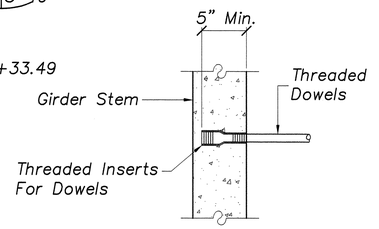


DIAPHRAGM SECTION

AT KEEHI IV GIRDER
INTERMEDIATE DIAPHRAGM DETAIL
A S-14 S-14 Not To Scale



SPAN C
DECK FRAMING PLAN
Scale: 1/8"=1'-0"



Allowable Tension = 4.8 Kips
Allowable Shear = 5.0 Kips

THREADED INSERT DETAIL
B S-13, S-14, S-19 S-14 Scale: 1 1/2"=1'-0"

DATE	REVISION
1/23/01	REVISED DECK FRAMING PLAN SEAT ELEVATIONS
12/21/00	ABUTMENT NO. 2 REVISED
12/4/00	PIER NO. 1 AND NO. 2 STATIONS REVISED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DECK FRAMING PLANS, INTERMEDIATE DIAPHRAGM AT KEEHI IV GIRDER

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

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

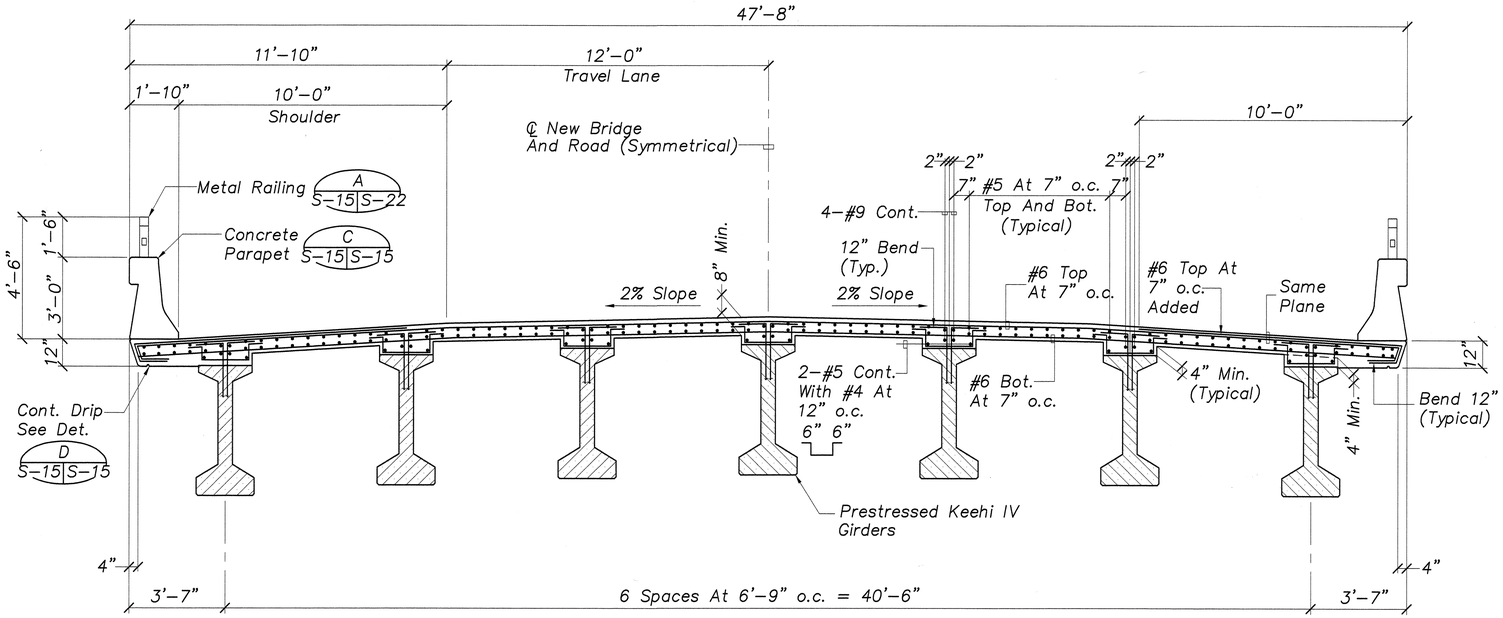
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. S-14 OF 26 SHEETS

C.O. 59

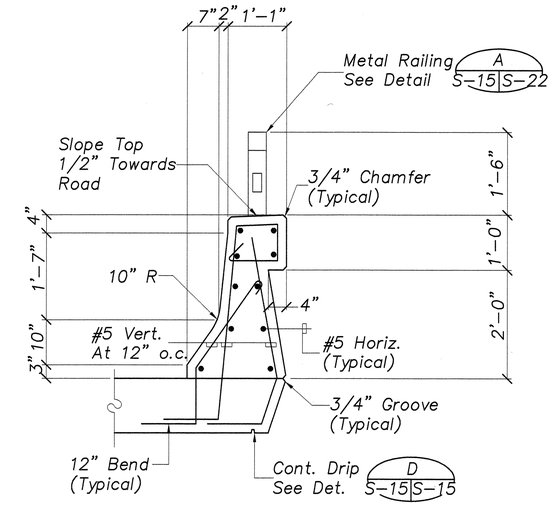
ORIGINAL PLAN | NOTE BOOK | No. | DATE
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	60	70



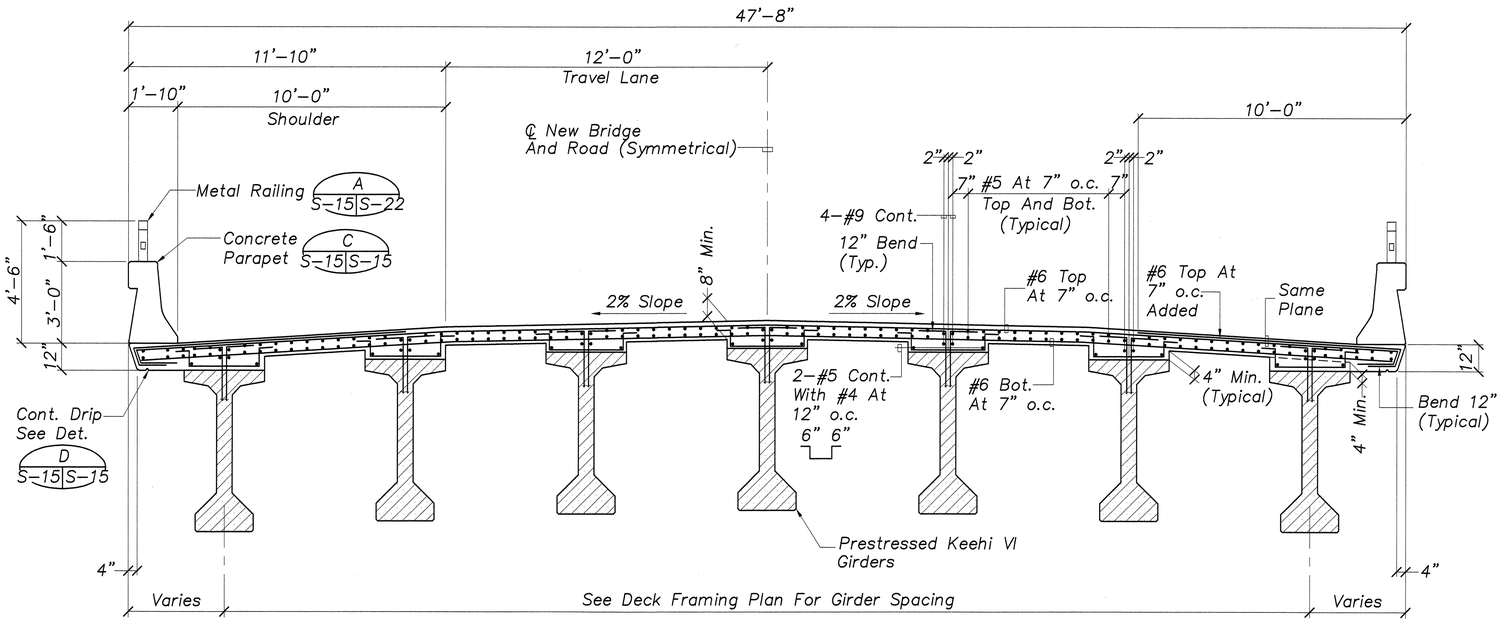
A S-14|S-15 NORMAL DECK SECTION AT KEEHI IV GIRDER

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



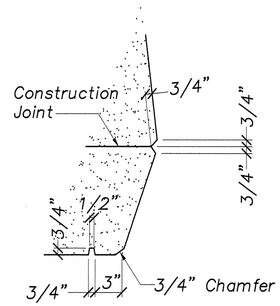
C S-3, S-15|S-15 CONC. PARAPET DET.

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



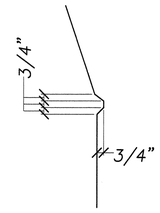
B S-13|S-15 NORMAL DECK SECTION AT KEEHI VI GIRDER

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



D S-3, S-15|S-15 SECTION

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



S-4, S-7, S-21, E S-24|S-15 GROOVE DET.

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.

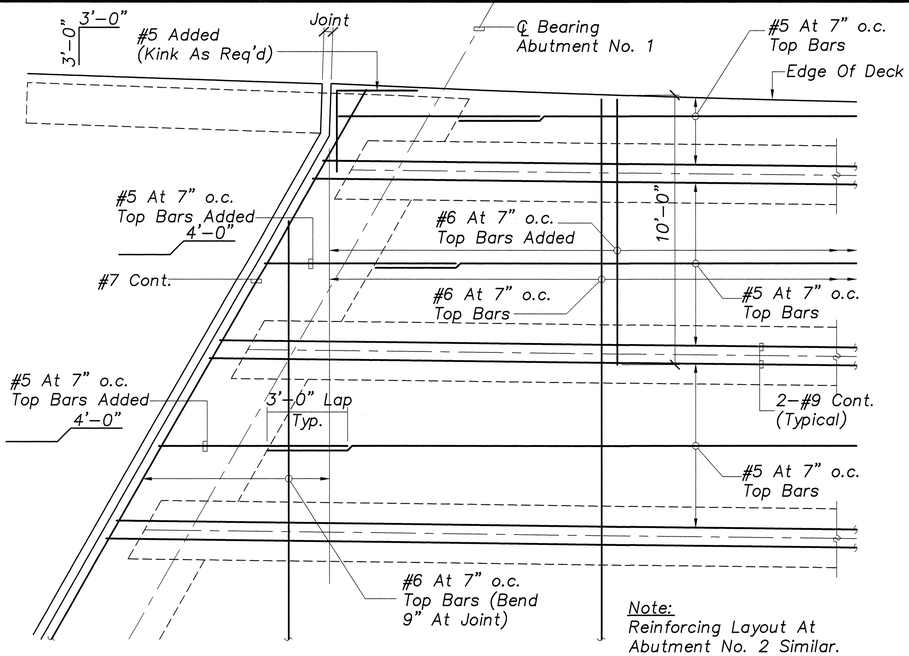
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
NORMAL DECK SECTIONS,
CONCRETE PARAPET DETAIL

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-15 OF 26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 61	70

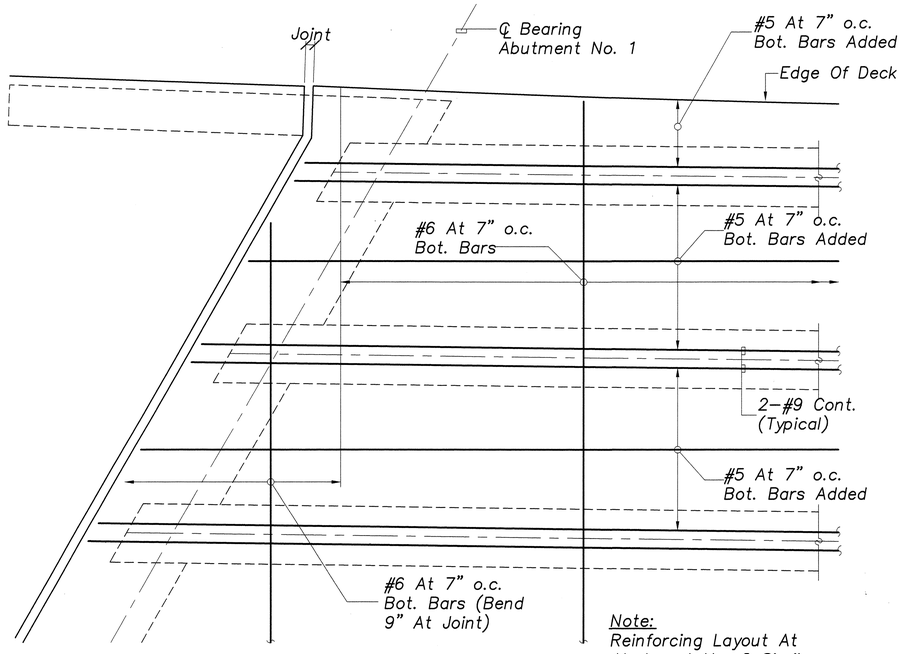


Note:
Reinforcing Layout At
Abutment No. 2 Similar.

AT ABUTMENT NO. 1

DECK TOP REINFORCING LAYOUT PLAN

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

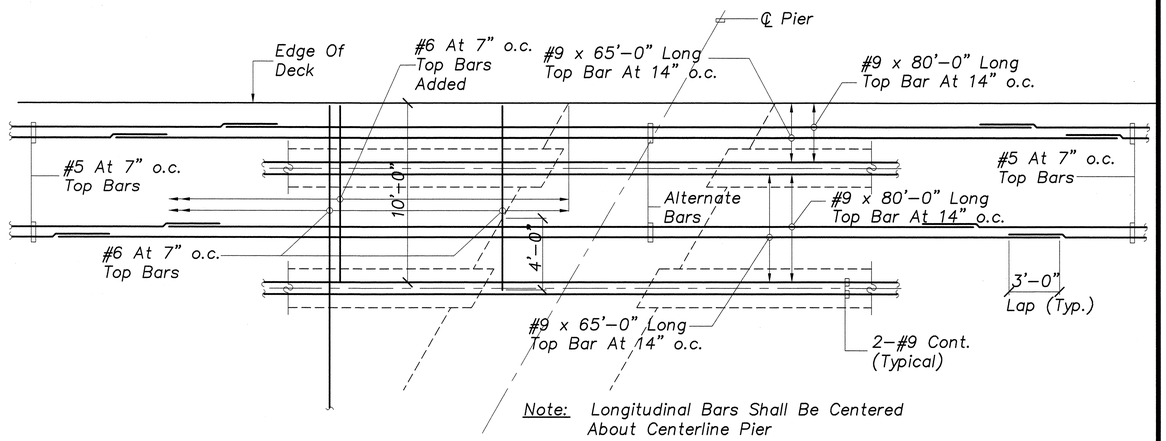


Note:
Reinforcing Layout At
Abutment No. 2 Similar.

AT ABUTMENT NO. 1

DECK BOTTOM REINFORCING LAYOUT PLAN

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

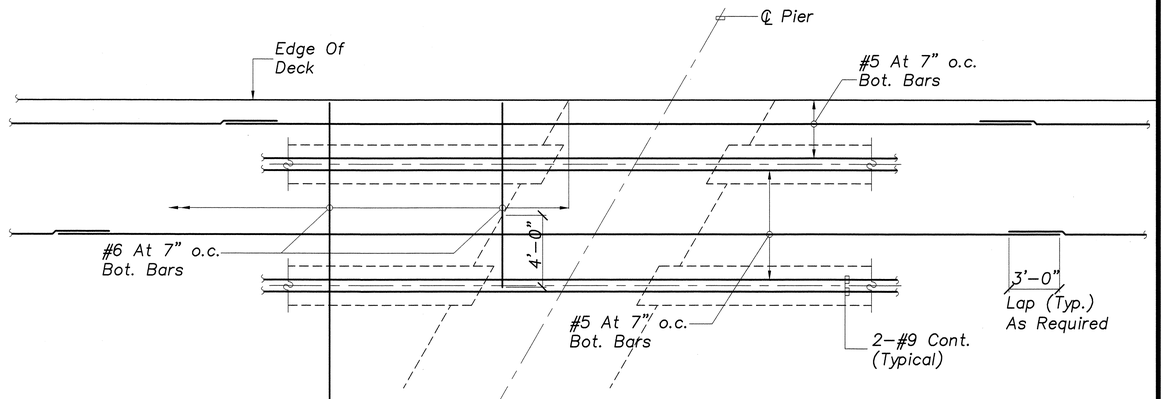


Note: Longitudinal Bars Shall Be Centered
About Centerline Pier

AT PIER

DECK TOP REINFORCING LAYOUT PLAN

Not To Scale



AT PIER

DECK BOTTOM REINFORCING LAYOUT PLAN

Not To Scale

12/21/00	NOTE ADDED TO ABUTMENT NO. 1 REINFORCING LAYOUT PLAN
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DECK REINFORCING LAYOUT PLANS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

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

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ME OR UNDER MY SUPERVISION.

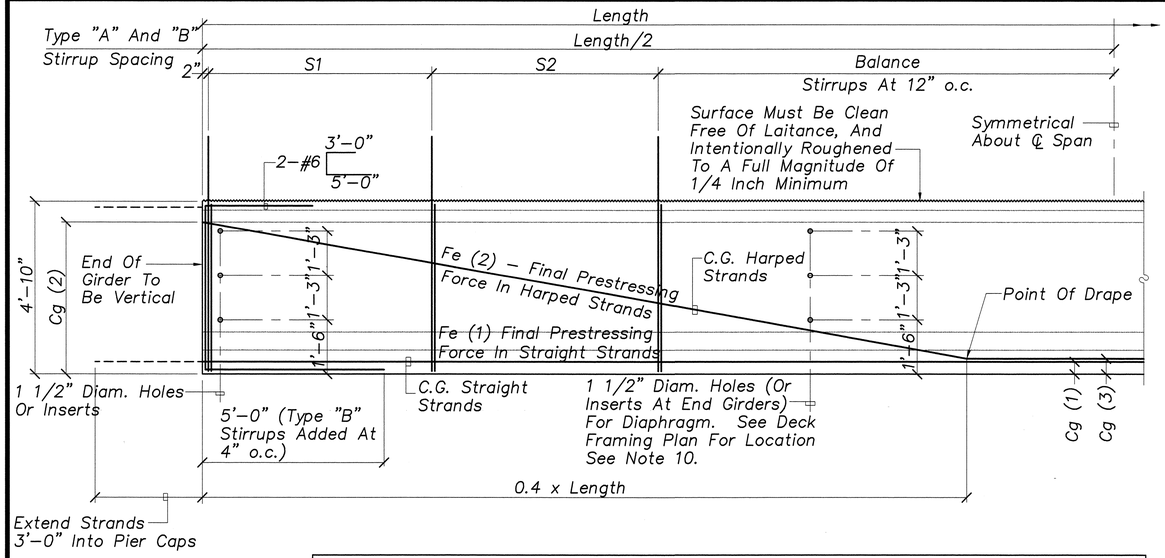
SHEET No. S-16 OF 26 SHEETS

C.O. 61

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

ORIGINAL PLAN
NOTE BOOK
No.

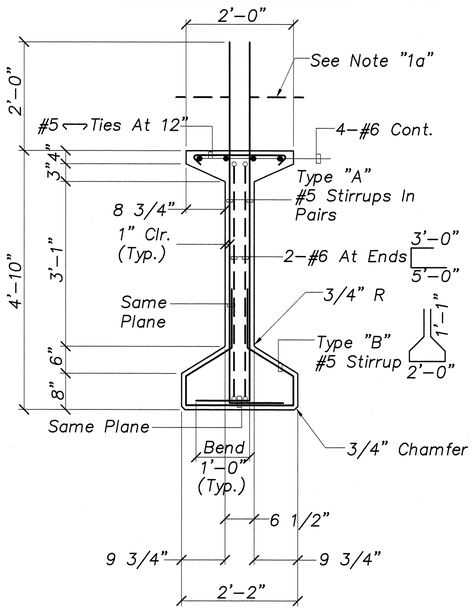
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 62	70



Notes:
1. Concrete Strength = 6,000 PSI
2. Concrete Strength At Transfer = 5,500 PSI
3. Final Prestressing Force Is After All Losses. Estimated Prestress Losses = 50,000 PSI Losses Are Due To Creep, Shrinkage, Elastic Shortening And Relaxation Of Steel

TYPICAL PRESTRESSED GIRDER ELEVATION (KEEHI IV)

Not To Scale

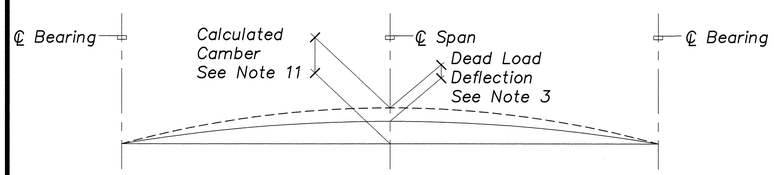


Note "1a"
Bend Bars In Field 2" Below Top Of Deck. All Reinforcing Dimensions Are Out To Out

TYPICAL GIRDER SECTION

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

Prestress Girder Notes:
1. Prestress 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 State Standard Specifications.
2. Non-Prestressed Reinforcing Steel Shall Be Grade 60, Unless Otherwise Noted On Plans, For Properties See State Standard Specifications.
3. Dead Load Deflection Includes The Combine Effects Of The Weight Of Slab, Haunch And Diaphragms.
4. Strand Pattern Shall Be Symmetrical About The Longitudinal Centerline Of The Girders.
5. Strand Release Sequence Shall Not Include Any Lateral Deflection Of The Girder.
6. The Contractor Shall Submit His Proposed Strand Pattern And Releasing Sequence To The Engineer For Approval.
7. During Curing, Care Shall Be Taken To Avoid Any Lateral Deflection Of the Girder Due To Improper Orientation.
8. Lifting Devices Shall Be Placed As Close As Possible To The Centerline Bearing Of The Girder. 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 The Girder Is Damaged Due To Failure Of The Lifting Devices.
9. Length Of Girders Do Not Include Effect Of Elastic Shortening.
10. The Contractor Shall Incorporate All Holes, Inserts And Other Embedded Items Required In Girders During Fabrication Of The Girders.
11. The Calculated Camber Includes The Effects Of The Initial Prestress Force And The Weight Of The Girder After Removal From The Bed. Negative Values Indicate A Net Upward Deflection. The Calculated Camber Value Has Been Multiplied By A Factor Of 2.0 To Approximate The Effect Of Camber Growth And Concrete Creep. The Actual Camber Shall Not Exceed The Calculated Camber By More Than 1/2".



KEEHI IV PRESTRESSED GIRDER SCHEDULE

Girder Mark	Fe (1)	Fe (2)	Cg (1)	Cg (2)	Cg (3)	S1	S2
G-1b G-2b G-3b G-4b G-5b G-6b G-7b	744k	326k	10.25"	46.00"	8.00"	60 At 4"	32 At 6"
G-5c G-6c G-7c	552k	322k	8.00"	48.00"	8.00"	36 At 4"	30 At 6"
G-1c G-2c G-3c G-4c	506k	276k	8.18"	49.00"	7.00"	36 At 4"	30 At 6"

GIRDER CAMBER DIAGRAM

Not To Scale

GIRDER CAMBER AND DEAD LOAD DEFLECTION TABLE

Girder Mark	Calculated Camber	Dead Load Deflection	Girder Mark	Calculated Camber	Dead Load Deflection
G-1b	-2.68"	1.54"	G-1c	-1.24"	0.47"
G-2b	-2.68"	1.54"	G-2c	-1.26"	0.45"
G-3b	-2.68"	1.54"	G-3c	-1.28"	0.50"
G-4b	-2.68"	1.54"	G-4c	-1.32"	0.54"
G-5b	-2.68"	1.54"	G-5c	-1.56"	0.59"
G-6b	-2.68"	1.54"	G-6c	-1.60"	0.64"
G-7b	-2.68"	1.54"	G-7c	-1.60"	0.79"

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

DATE	REVISION
12/21/00	GIRDER G-1C TO G-7C REVISED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KEEHI IV GIRDER DETAILS

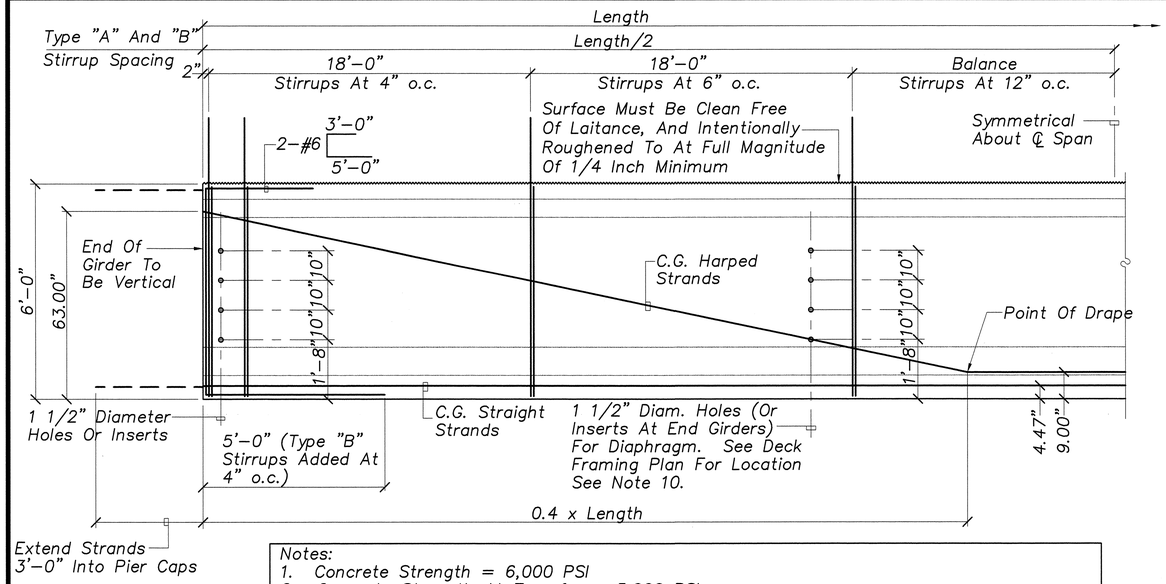
HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

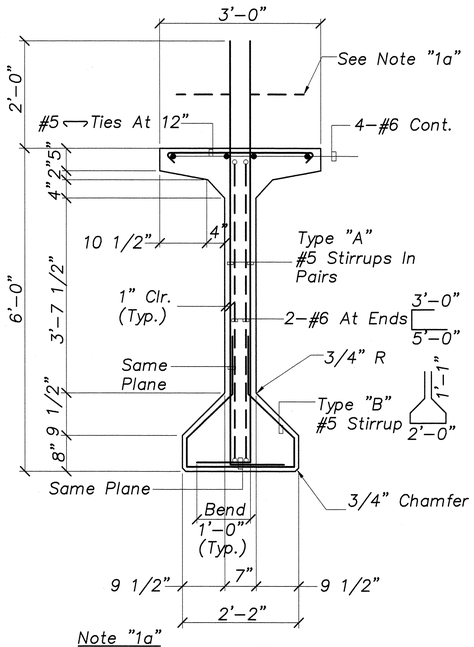
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 63	70



Notes:
1. Concrete Strength = 6,000 PSI
2. Concrete Strength At Transfer = 5,000 PSI
3. Final Prestressing Force In Harped Strands = 377 KIPS
4. Final Prestressing Force In Straight Strands = 800 KIPS
5. Final Prestressing Force Is After All Losses. Estimated Prestress Losses = 48,750 PSI Losses Are Due To Creep, Shrinkage, Elastic Shortening And Relaxation Of Steel
6. Mask Bottom 10 Straight Strands 20'-0" At Each End. Center Of Gravity Of Masked Strands From Bottom Of Girder Is 2.00".

TYPICAL PRESTRESSED GIRDER ELEVATION (KEEHI VI)

Not To Scale

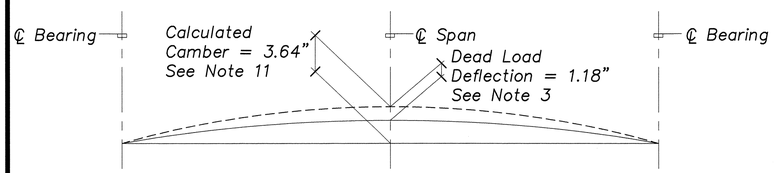


Note "1a"
Bend Bars In Field 2" Below Top Of Deck
All Reinforcing Dimensions Are Out To Out

TYPICAL GIRDER SECTION

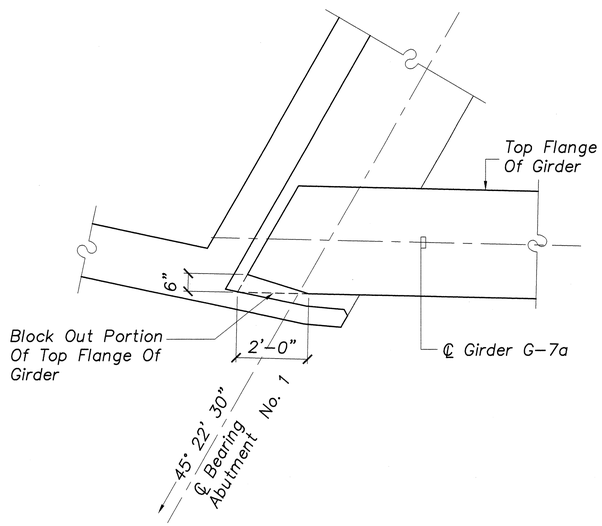
Scale: 3/4"=1'-0"

Prestress Girder Notes:
1. Prestress 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 State Standard Specifications.
2. Non-Prestressed Reinforcing Steel Shall Be Grade 60, Unless Otherwise Noted On Plans, For Properties See State Standard Specifications.
3. Dead Load Deflection Includes The Combine Effects Of The Weight Of Slab, Haunch And Diaphragms.
4. Strand Pattern Shall Be Symmetrical About The Longitudinal Centerline Of The Girders.
5. Strand Release Sequence Shall Not Include Any Lateral Deflection Of The Girder.
6. The Contractor Shall Submit His Proposed Strand Pattern And Releasing Sequence To The Engineer For Approval.
7. During Curing, Care Shall Be Taken To Avoid Any Lateral Deflection Of the Girder Due To Improper Orientation.
8. Lifting Devices Shall Be Placed As Close As Possible To The Centerline Bearing Of The Girder. 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 The Girder Is Damaged Due To Failure Of The Lifting Devices.
9. Length Of Girders Do Not Include Effect Of Elastic Shortening.
10. The Contractor Shall Incorporate All Holes, Inserts And Other Embedded Items Required In Girders During Fabrication Of The Girders.
11. The Calculated Camber Includes The Effects Of The Initial Prestress Force And The Weight Of The Girder After Removal From The Bed. Negative Values Indicate A Net Upward Deflection. The Calculated Camber Value Has Been Multiplied By A Factor Of 2.0 To Approximate The Effect Of Camber Growth And Concrete Creep. The Actual Camber Shall Not Exceed The Calculated Camber By More Than 1/2".
12. Top Flange Of Girder G-7a Shall Be Blocked Out As Shown On Detail This Sheet.



GIRDER CAMBER DIAGRAM (KEEHI VI)

Not To Scale



BLOCK OUT DETAIL AT GIRDER G-7a

Not To Scale

ORIGINAL PLAN
NOTE BOOK
No.

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

12/21/00	NOTE 12. AND DETAIL ADDED
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
KEEHI VI GIRDER DETAILS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

GEORGE K. NISHIMURA
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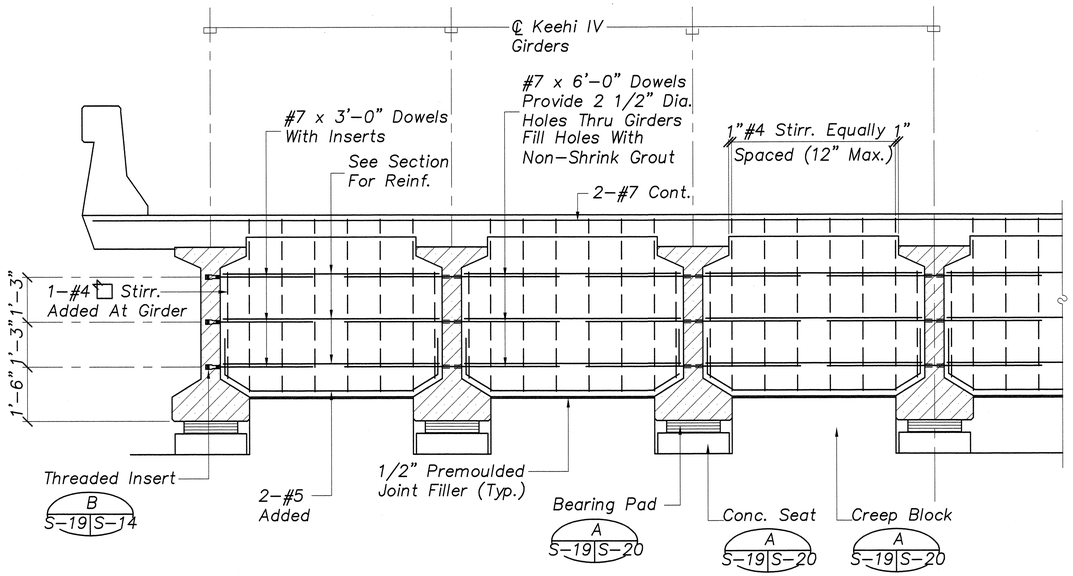
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

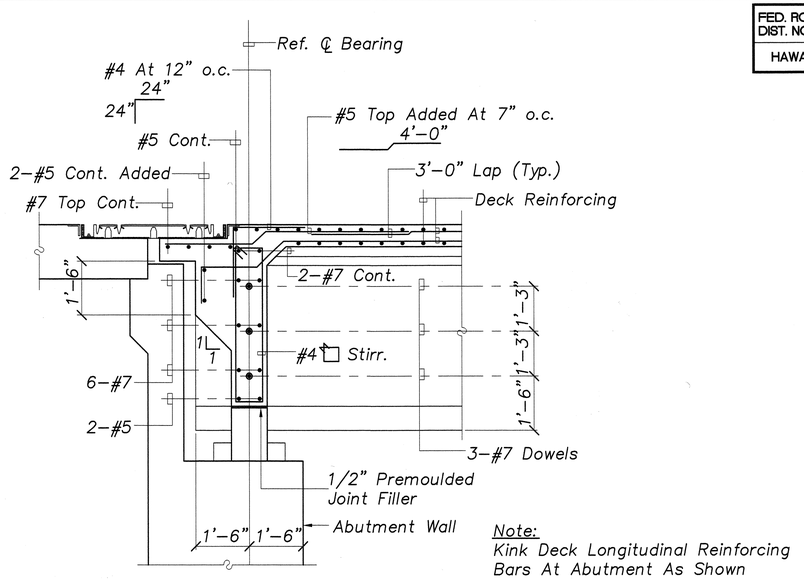
SHEET No. S-18 OF 26 SHEETS

C.O. 63

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	64	70



DIAPHRAGM ELEVATION

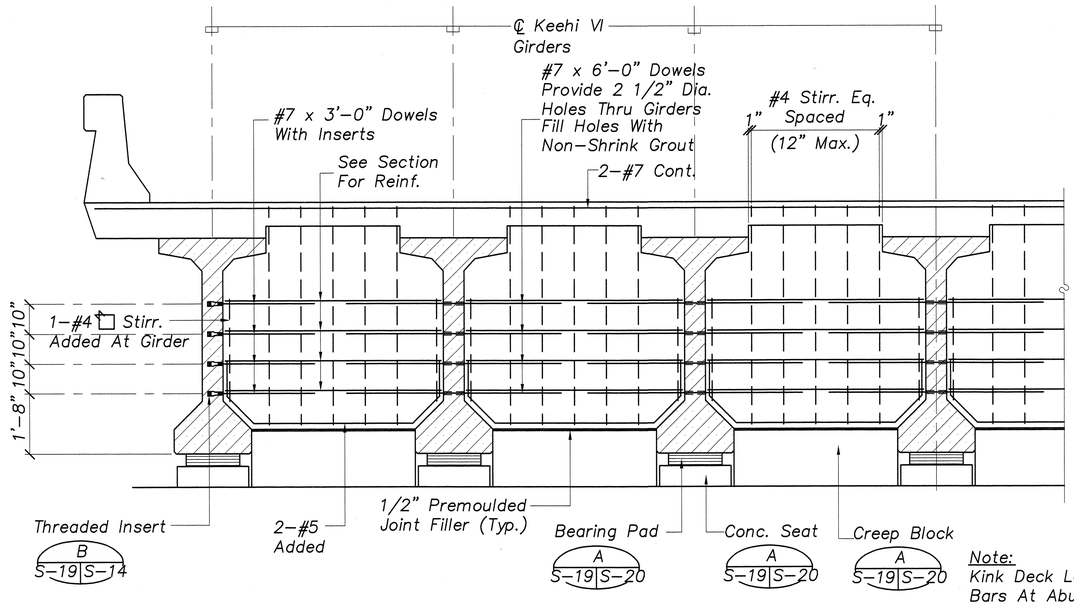


Note:
Kink Deck Longitudinal Reinforcing Bars At Abutment As Shown

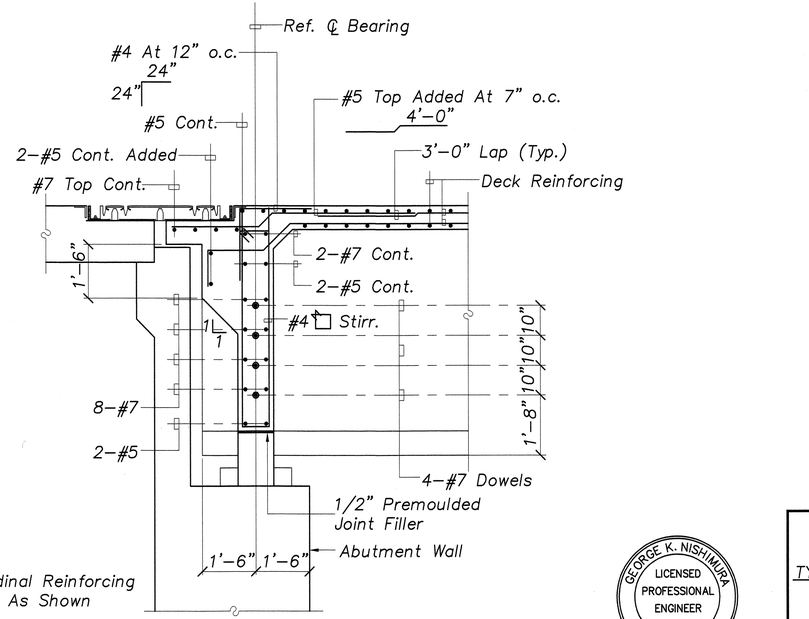
DIAPHRAGM SECTION

A S-14 S-18 TYPICAL END DIAPHRAGM AT KEEHI IV GIRDER

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



DIAPHRAGM ELEVATION



Note:
Kink Deck Longitudinal Reinforcing Bars At Abutment As Shown

DIAPHRAGM SECTION

B S-13 S-18 TYPICAL END DIAPHRAGM AT KEEHI VI GIRDER

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

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

GEORGE K. NISHIMURA
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HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

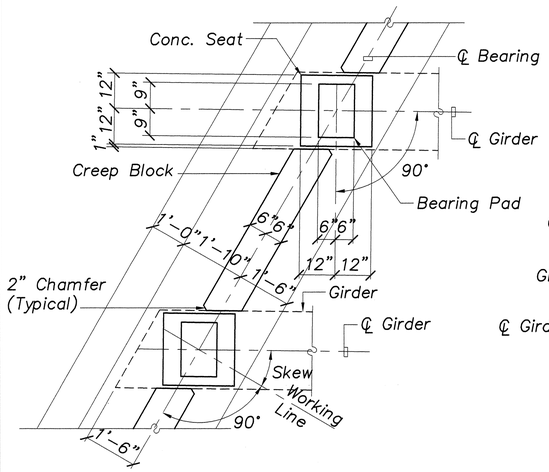
TYPICAL END DIAPHRAGM GIRDER DETAILS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

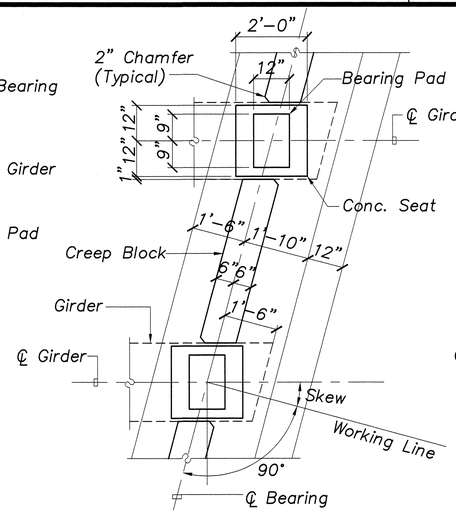
Scale: As Noted Date: May, 1999

SHEET No. S-19 OF 26 SHEETS

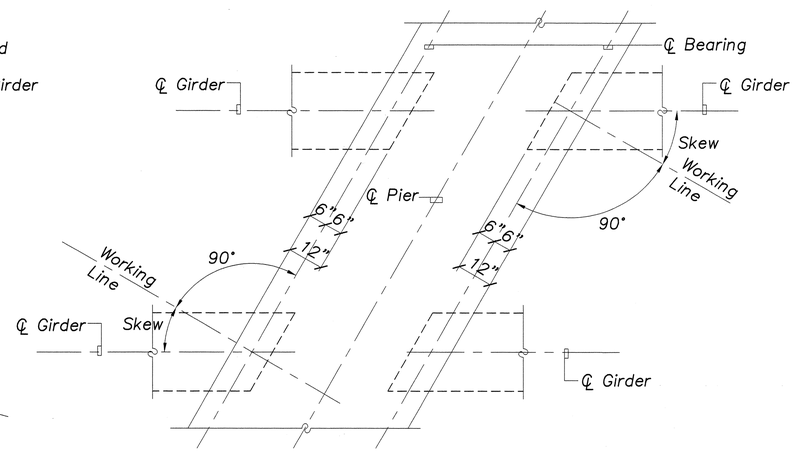
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 65	70



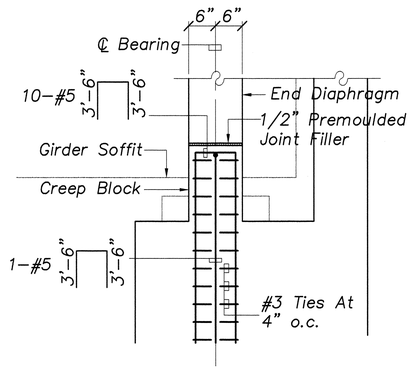
PLAN AT ABUTMENT NO. 1



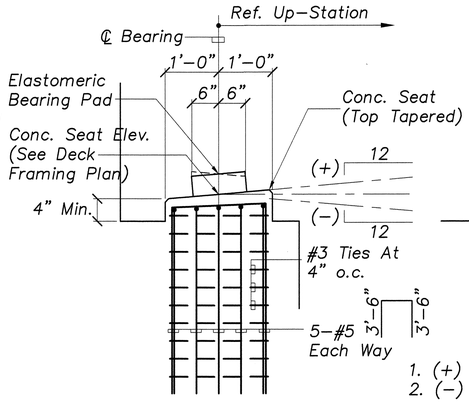
PLAN AT ABUTMENT NO. 2



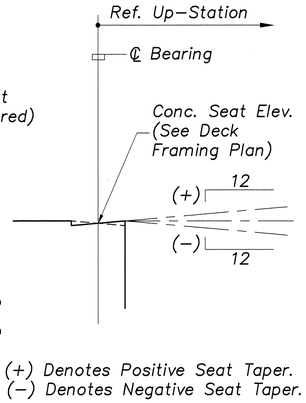
PLAN AT PIER



SECTION AT CREEP BLOCK



AT ABUTMENT SECTION AT CONC. SEAT

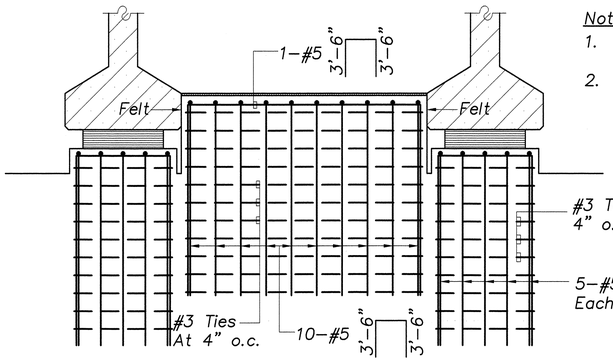


AT PIER

1. (+) Denotes Positive Seat Taper.
2. (-) Denotes Negative Seat Taper.

CONCRETE SEAT SKEW AND TAPER TABLE

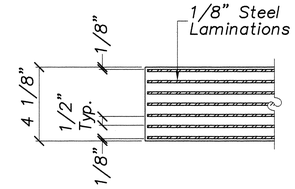
	Skew		Taper	
Girder	Down-Station	Up-Station	Down-Station	Up-Station
G-1a	29° 05' 34"	29° 05' 34"	-7/16 : 12	-7/16 : 12
G-2a	29° 02' 32"	29° 02' 32"	-7/16 : 12	-7/16 : 12
G-3a	28° 59' 29"	28° 59' 29"	-1/2 : 12	-1/2 : 12
G-4a	28° 56' 31"	28° 56' 31"	-1/2 : 12	-1/2 : 12
G-5a	28° 53' 24"	28° 53' 24"	-9/16 : 12	-9/16 : 12
G-6a	28° 50' 20"	28° 50' 20"	-5/8 : 12	-5/8 : 12
G-7a	28° 47' 17"	28° 47' 17"	-5/8 : 12	-5/8 : 12
G-1b	30°	30°	-5/16 : 12	-5/16 : 12
G-2b	30°	30°	-5/16 : 12	-5/16 : 12
G-3b	30°	30°	-5/16 : 12	-5/16 : 12
G-4b	30°	30°	-3/8 : 12	-3/8 : 12
G-5b	30°	30°	-3/8 : 12	-3/8 : 12
G-6b	30°	30°	-3/8 : 12	-3/8 : 12
G-7b	30°	30°	-7/16 : 12	-7/16 : 12
G-1c	30°	15°	-1/4 : 12	-1/4 : 12
G-2c	30°	15°	-1/4 : 12	-1/4 : 12
G-3c	30°	15°	-1/4 : 12	-1/4 : 12
G-4c	30°	15°	-1/4 : 12	-1/4 : 12
G-5c	30°	15°	-3/16 : 12	-3/16 : 12
G-6c	30°	15°	-3/16 : 12	-3/16 : 12
G-7c	30°	15°	-3/16 : 12	-3/16 : 12



SECTION THRU GIRDERS

Notes:

1. All Girder Concrete Seats Shall Be Placed Perpendicular To The Girder.
2. Girder Concrete Seats Shall Be Poured Monolithic With Pier Caps And Abutment Walls. Creep Blocks At Abutments Shall Be Poured After Girders Are Set.



ELASTOMERIC BEARING PAD

1/23/01	CONCRETE SEAT SKEW AND TAPER TABLE REVISED
12/21/00	PLAN AT ABUTMENT NO. 2 REVISED, CONC. SEAT SKEW AND TAPER TABLE REVISED
DATE	REVISION

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BEARING PAD, CONCRETE SEAT AND CREEP BLOCK DETAILS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

GEORGE K. NISHIMURA
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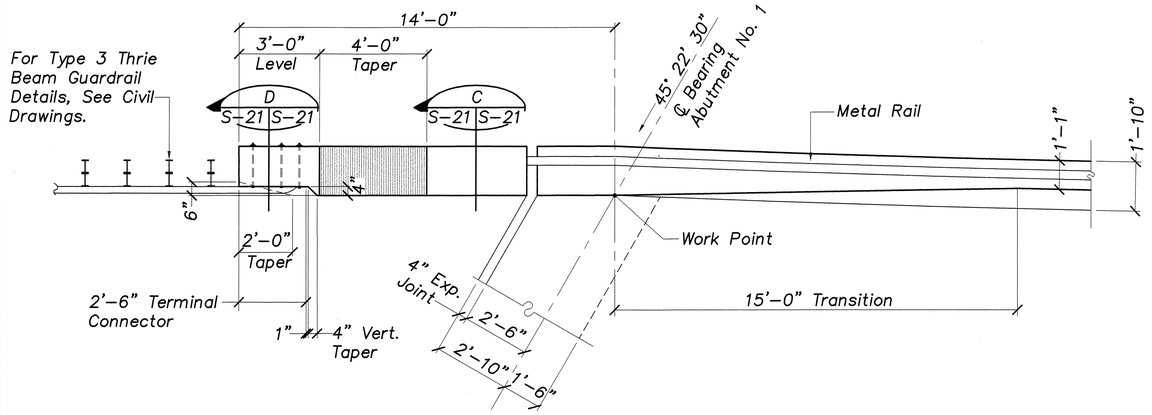
S-5, S-6, S-8, S-9, S-19 S-20 (A) Not To Scale

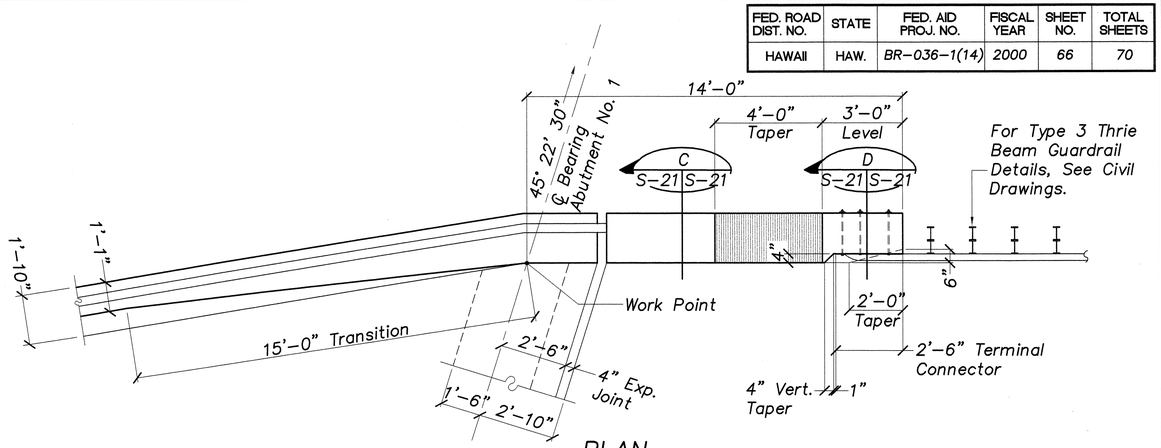
SHEET No. S-20 OF 26 SHEETS

C.O. 65

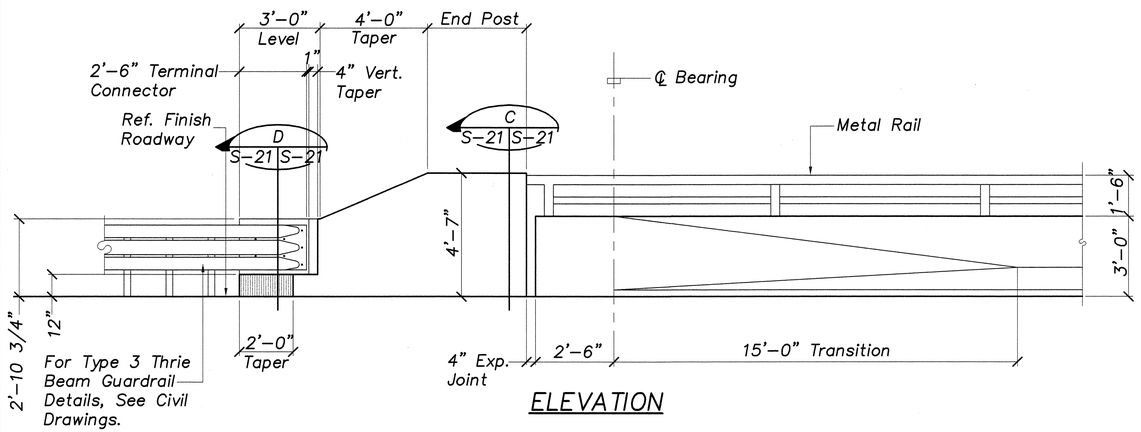
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	66	70



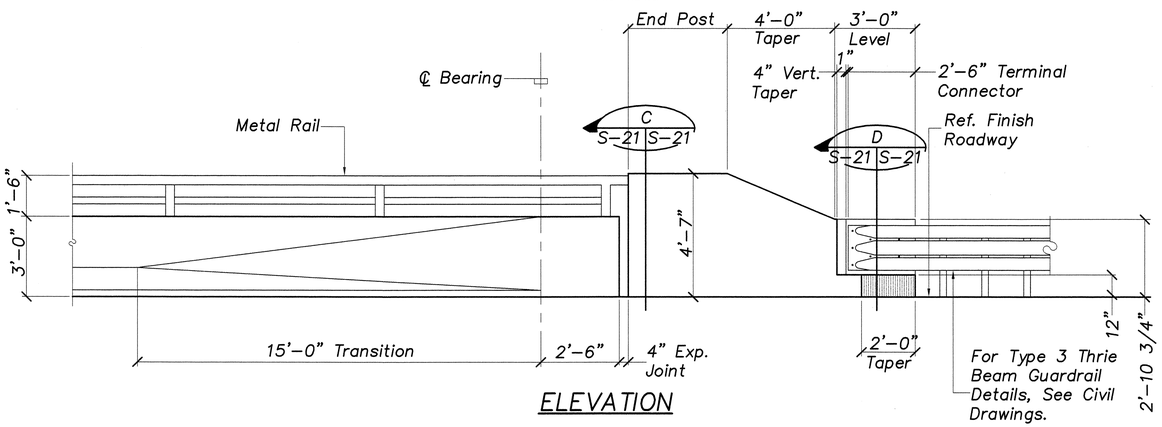
PLAN



PLAN



ELEVATION



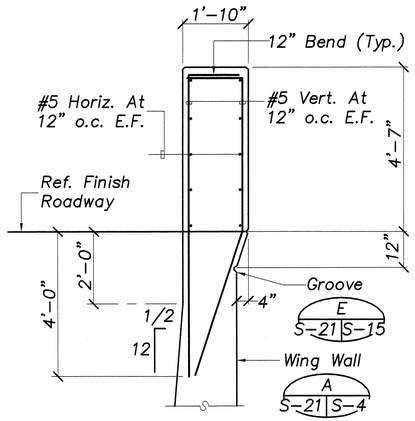
ELEVATION

A S-6 S-21 TYPICAL GUARDRAIL TO END POST NO. 1 CONNECTION DET.

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

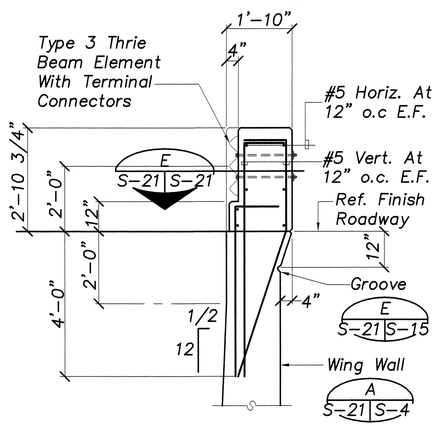
B S-6 S-21 TYPICAL GUARDRAIL TO END POST NO. 2 CONNECTION DET.

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



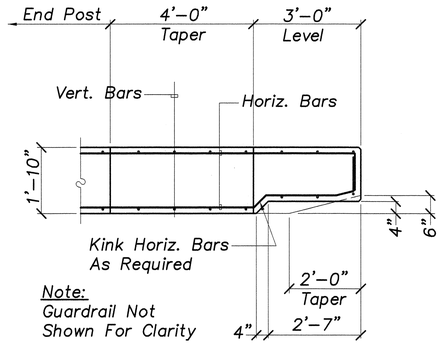
S-21, S-22, C S-25 S-21 SECTION

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



S-21, S-22, D S-25 S-21 SECTION

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



E S-21 S-21 SECTION

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

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DESIGNED BY
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CHECKED BY
DATE

ORIGINAL PLAN
NOTE BOOK
No.

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

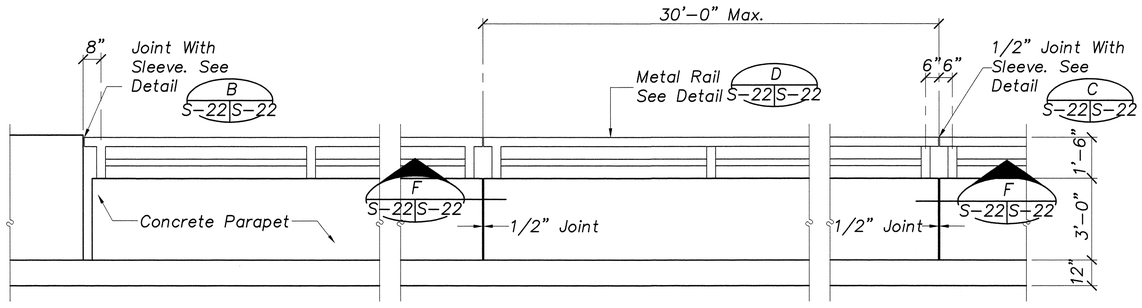
TYPICAL GUARDRAIL TO END POST CONNECTION DETAIL

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

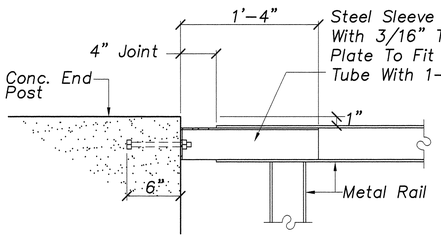
SHEET No. S-21 OF 26 SHEETS

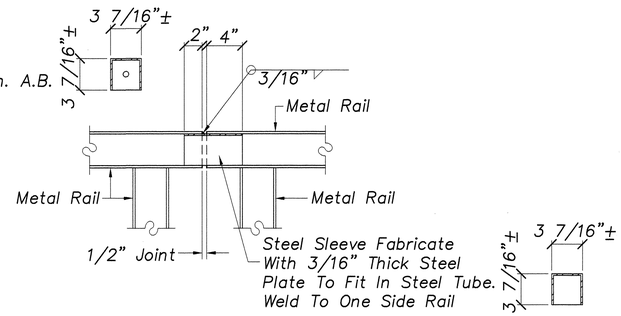
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 67	70



TYPICAL PARAPET AND METAL RAIL ELEVATION

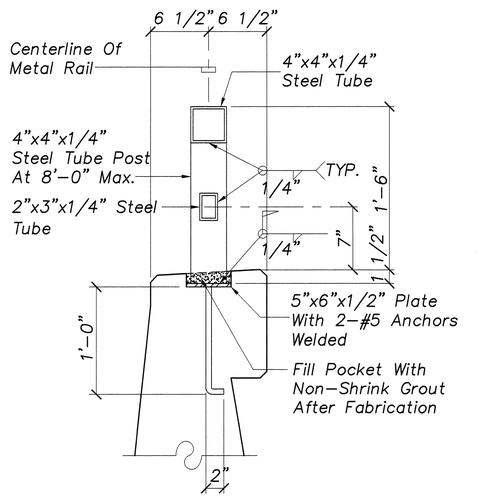
A S-3, S-15, S-23, S-24 S-22 Scale: 3/8"-1'-0"





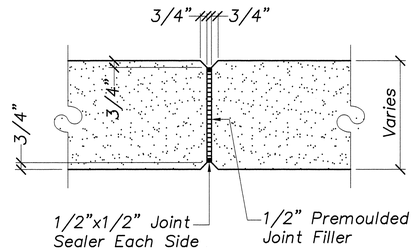
DETAIL

B S-22 S-22 Scale: 1 1/2"=1'-0"



DETAIL

C S-22 S-22 Scale: 1 1/2"=1'-0"



SECTION

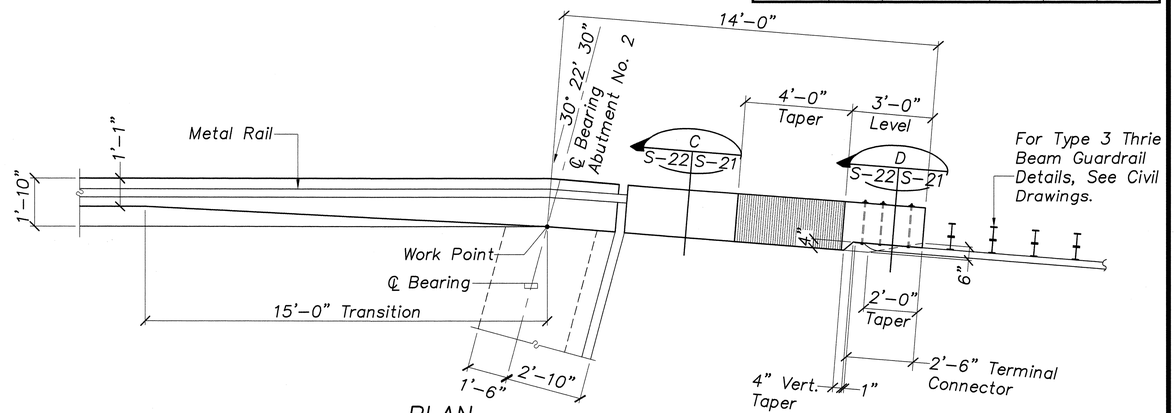
F S-22 S-22 Scale: 1 1/2"=1'-0"

Note:

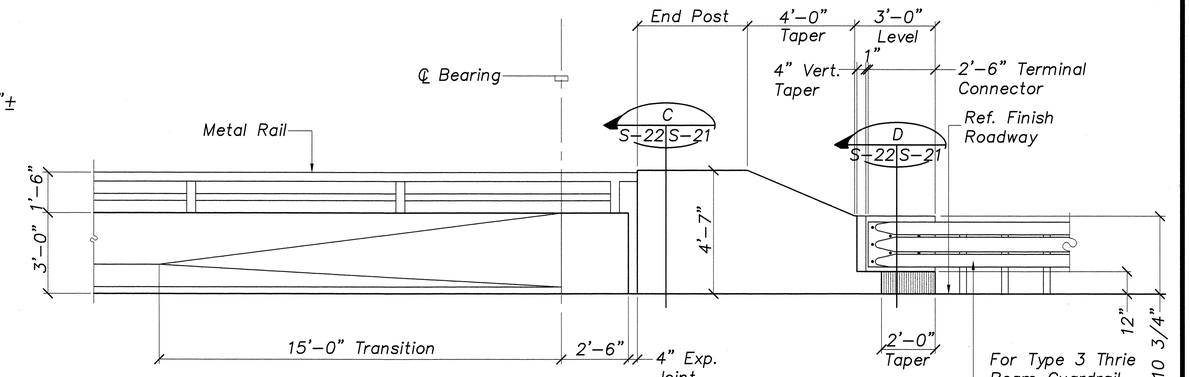
1. Grind All Exposed Welded Joints On Metal Rail Smooth.
2. Metal Rail Assembly Shall Be Hot Dipped Galvanized After Fabrication.
3. All Exposed Metal Rail Shall Be Painted After Installation. Prior To Painting, Rough Areas Of Galvanized Surface Shall Be Ground Smooth.

METAL RAIL DETAIL

D S-22 S-22 Scale: 1 1/2"=1'-0"



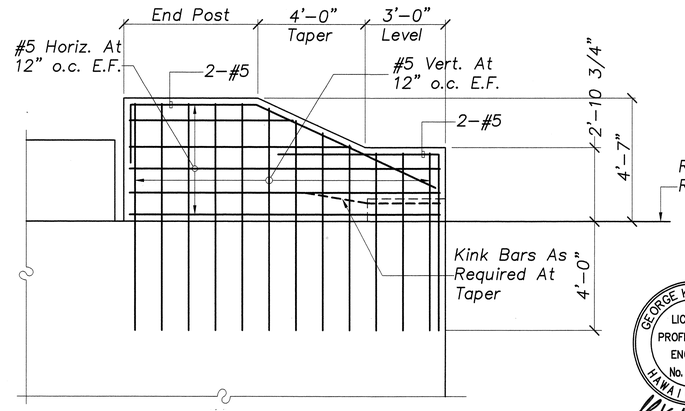
PLAN



ELEVATION

E S-8 S-22 Scale: 3/8"=1'-0"

TYPICAL GUARDRAIL TO END POST NO. 3 CONNECTION DET.



ELEVATION AT END POST

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

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

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DATE	REVISION
12/21/00	"TYPICAL GUARDRAIL TO END POST NO. 3 CONNECTION DETAIL" REVISED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL PARAPET AND METAL RAIL DETAIL, TYPICAL GUARDRAIL TO END POST CONNECTION DETAIL

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-22 OF 26 SHEETS

C.O. 67

ORIGINAL PLAN
NOTE BOOK No.

SURVEY PLOTTED BY
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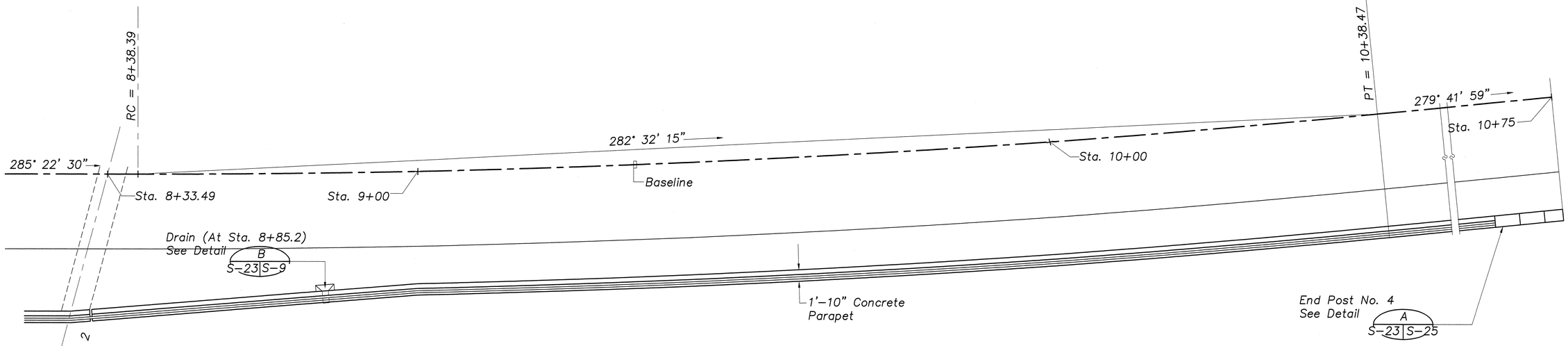
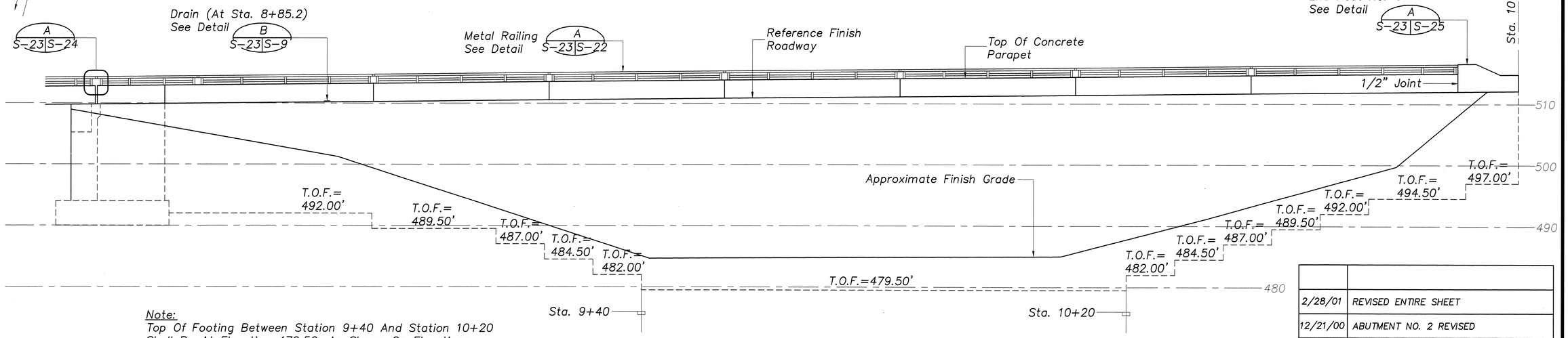
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 68	70



PLAN AT MSERW RETAINING WALL

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



Note:
Top Of Footing Between Station 9+40 And Station 10+20
Shall Be At Elevation 479.50, As Shown On Elevations.

ELEVATION AT MSERW RETAINING WALL

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

SURVEY PLOTTED BY
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ORIGINAL PLAN
NOTE BOOK
No.

2/28/01	REVISED ENTIRE SHEET
12/21/00	ABUTMENT NO. 2 REVISED
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN AT MSERW RETAINING WALL,
ELEVATION AT MSERW RETAINING WALL

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

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SHEET No. S-23 OF 26 SHEETS

C.O. 68

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	C.O. 69	70

Notes:

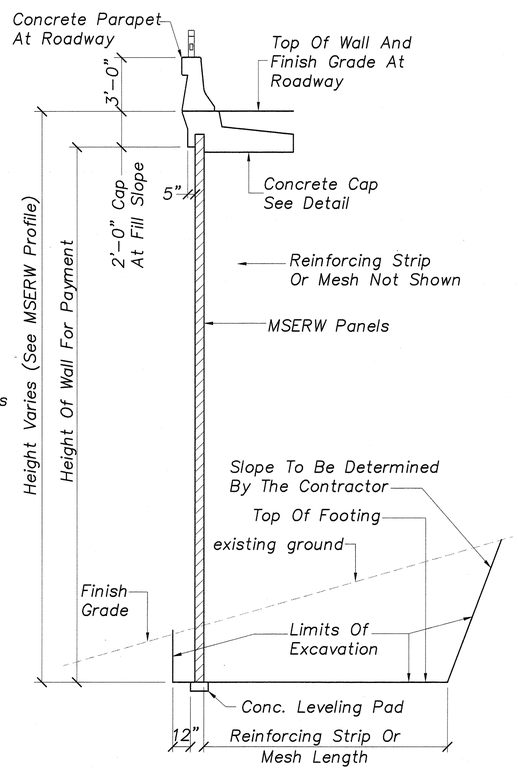
1. Retaining wall shall be constructed as a design-build MSERW. Refer to section 520-Mechanically Stabilized Earth Retaining Wall System of the special provisions.
2. The reinforced zone behind the MSERW shall be founded on level ground. The area of the reinforced zone and the MSERW shall be excavated such that there is a minimum lateral distance of 4 feet between the lower outside edge of the wall and the compacted slope face.
3. The actual design of the MSERW shall be performed in accordance with the Manufacturer's requirements.
4. Reference stations are measured along baseline of road, unless noted otherwise.
5. The assumed size for the Mechanically Stabilized Earth Retaining Wall (MSERW) Panels is 5'-0" x 5'-0" actual size and shape (square "cruciform", hexagonal, etc.) will be determined by the actual MSERW System chosen.
6. MSERW Panels along curves will be formed by a series of chords to match, as closely as possible, the desired wall alignment, except as noted and approved by the Engineer.
7. Top of Footing (T.O.F.) elevations shown on plans are approximate. Final T.O.F. elevations shall be determined by actual site conditions and the MSERW manufacturer, except in areas as noted on sheet S-23. Shop drawings indicating actual T.O.F. elevations will be prepared by the Contractor and submitted to the Engineer for review . Final T.O.F. elevations shall be approved by the Engineer prior to placement of the Concrete Leveling Pad.
8. Concrete leveling pad and concrete cap size and reinforcing shall be determined by the MSERW manufacturer.
9. Expansion joints (30'-0" maximum) shall be provided for C.I.P. concrete cap and concrete parapet. At expansion joints, provide steel sleeve in metal railing as shown in detail C/S-22. Actual spacings of joints, details and reinforcing shall be determined by the MSERW manufacturer and approved by the Engineer.
10. Brace all C.I.P. (Cast-In-Place) structures as required during construction.
11. MSERW manufacturer to verify the adequacy of the reinforcing steel for the various structures. Additional reinforcing steel for a particular system shall be added, as required by the MSERW manufacturer. No payment shall be made for additional reinforcing steel required for the particular MSERW System used.
12. Finish for MSERW shall be:
    a. Heavy sandblast texture finish using formliners for precast concrete wall panel and drop inlet.
    b. Light sandblast texture finish using formliners for concrete barrier and cap.
13. The minimum length of reinforcing strip or mesh shall be 1.2 times the wall height but not less than 10 feet. The wall height is to be measured from top of leveling pad to upper finish grade.

Note "A"

Positive bond breaker shall be provided between cast-in-place concrete and precast concrete wall.

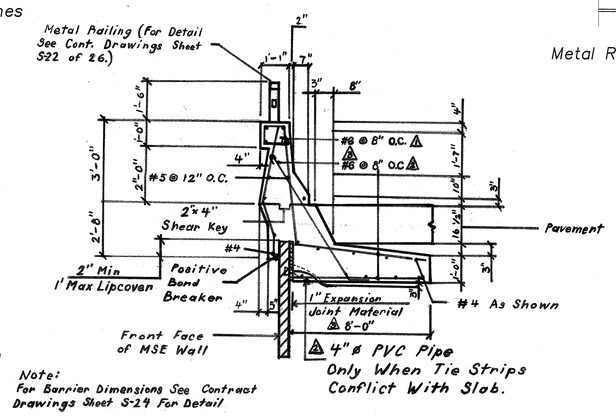
INSPECTION ELEMENT NOTES:

1. Inspection elements for inspecting corrosion of metal reinforcing strip or mesh at future date shall be installed on each MSERW at a uniform spacing of 50 feet (maximum) horizontally along the wall. The first exposed panels above final finish grade.
2. Inspection elements shall be fabricated from an element representative of the elements used to stabilize the wall.
3. Contractor shall submit shop drawings indicating locations of the inspection element on each wall, complete details of the inspection element installation and provisions for removal of these elements.
4. Inspection elements will not be measured and shall be considered incidental to MSERW materials.



TYPICAL SECTION (MSERW)

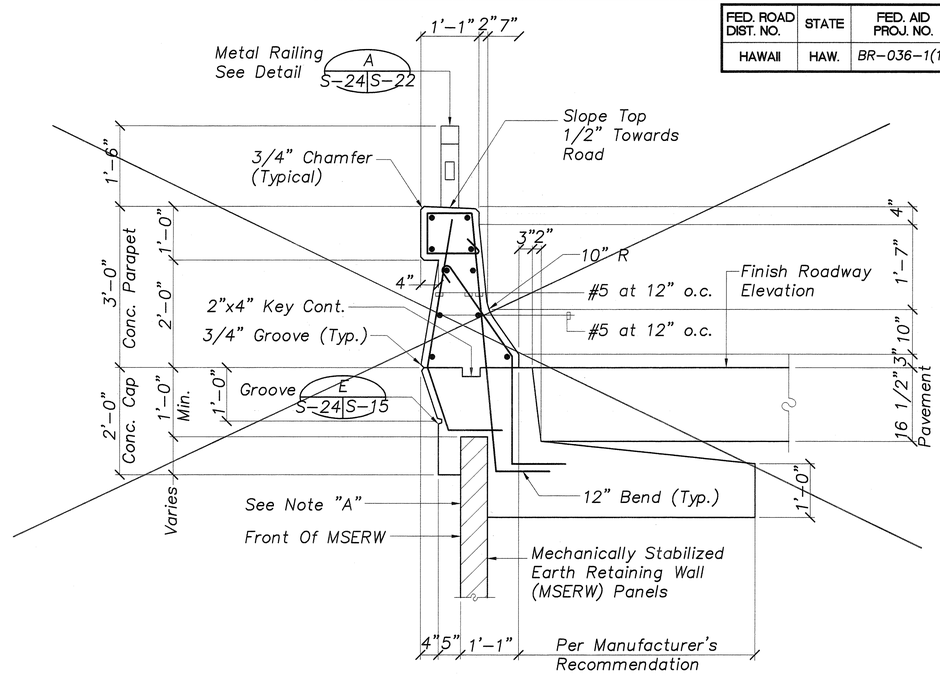
Not To Scale



REVISED RECO

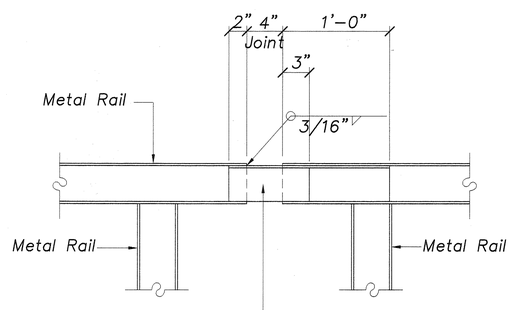
CONCRETE PARAPET DETAIL

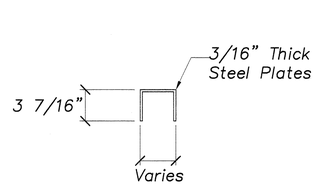
Scale: NTS

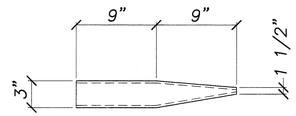


SECTION AT CONCRETE PARAPET

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







A S-23 S-24

DETAIL

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

2/28/01	Note 7. Revised
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MSERW RETAINING WALL DETAILS

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

GEORGE K. NISHIMURA
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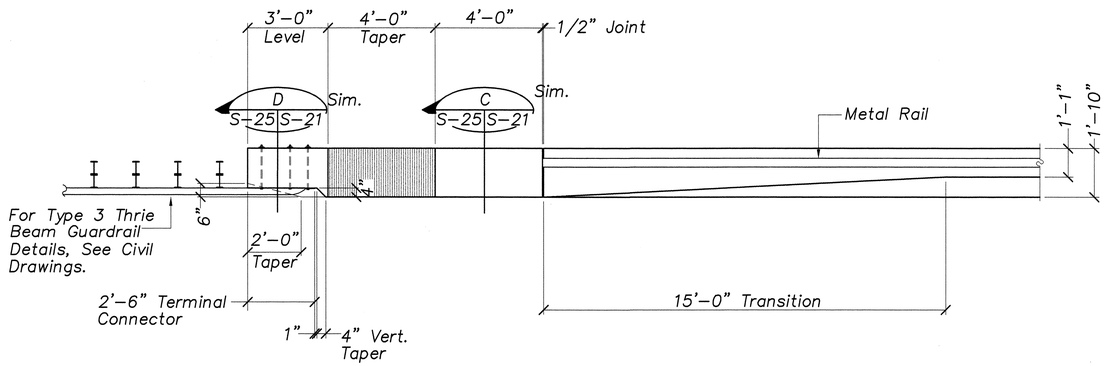
"AS-BUILT"

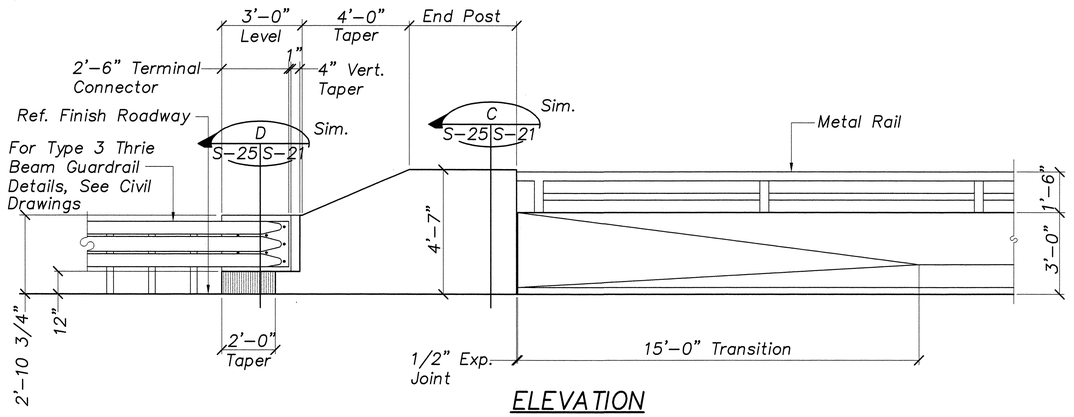
SHEET No. S-24 OF 26 SHEETS

C.O. 69

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-036-1(14)	2000	70	70



PLAN



ELEVATION

TYPICAL GUARDRAIL TO END POST NO. 4 CONNECTION DET.

A
S-23 S-25 Scale: 3/8"=1'-0"

ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY
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HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL GUARDRAIL TO END POST NO. 3 CONNECTION DETAIL

HANA HIGHWAY
REPLACEMENT OF UAOA BRIDGE AND APPROACHES
DISTRICT OF MAKAWAO
Federal-Aid Project No. BR-036-1(14)

Scale: As Noted Date: May, 1999

SHEET No. S-25 OF 26 SHEETS