FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	31	145

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

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STATE OF HAWAI'I
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INDEX TO DRAWINGS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS0.1 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	32	145

ESTIMATED QUANTITIES

ITEM NO.	ITEM	QUAN.	UNIT	ITEM NO.	ITEM	QUAN.	UNIT
202.0420	Removal of Existing 4'x10' Concrete Culvert	(1 EACH)	L.S.	504.6100	Concrete for Prestressed Planks	(1160 L.F.)	L.S.
206.6000	Structure Excavation for Abutments and Piers	2680	CY	507.7000	Concrete End Posts	(4 EA)	L.S.
				507.7002	Bridge Railing Including Metal Rails	248	L.F.
206.6001	Structure Excavation for Wingwalls	1675	CY				
				602.0080	Reinforcing Steel for Abutments	(32,000 LBS)	L.S.
206.7200	Structure Backfill for Abutments	510	CY				
				602.0081	Reinforcing Steel for Abutment Footings	(10,000 LBS)	L.S.
206.7201	Structure Backfill for Abutments and Piers (Class D Concrete)	200	CY				
				602.0082	Reinforcing Steel for Bridge Deck	(65,000 LBS)	L.S.
206.7202	Structure Backfill for Wingwalls	500	CY	602.0083	Reinforcing Steel for Pier Walls	(43,000 LBS)	L.S.
206.7203	Structure Backfill for Wingwalls (Class D Concrete)	100	CY	602.0084	Reinforcing Steel for Pier Wall Footings	(16,000 LBS)	L.S.
313.1000	Controlled Low Strength Material at Wingwalls	280	CY	602.0086	Reinforcing Steel for Wingwalls	(60,000 LBS)	L.S.
503.1090	Concrete for Abutments	(140 CY)	L.S.	602.0087	Reinforcing Steel for Wingwall Footings	(95,000 LBS)	L.S.
503.1091	Concrete for Abutment Footings	(88 CY)	L.S.	602.0088	Reinforcing Steel for Approach Slab	(32,000 LBS)	L.S.
503.1092	Concrete for Bridge Deck	(187 CY)	L.S.	612.0100	Grouted Rubble Paving	130	S.Y.
503.1093	Concrete for Pier Walls	(149 CY)	L.S.				
503.1094	Concrete for Pier Wall Footings	(80 CY)	L.S.				
503.1096	Concrete for Wingwalls	(220 CY)	L.S.				
503.1097	Concrete for Wingwall Footings	(260 CY)	L.S.				
503.1101	Concrete for Approach Slab	(80 CY)	L.S.				

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ORIGINAL PLAN
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ESTIMATED QUANTITIES

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS0.2 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	ADD. 33	145

BRIDGE GENERAL NOTES

1. General Specifications: Hawaii Department of Transportation, Standard Specifications for Road and Bridge Construction, 1994, together with Special Provisions prepared for this contract.
2. Design Specifications: AASHTO 1998 LRFD Bridge Design Specifications (Second Edition) and its subsequent interim specifications with interim supplements and modifications by the Highways Division, Department of Transportation, State of Hawaii.
3. Loads:
   (A) Dead Load: An allowance of 25 PSF for future wearing surface of asphalt concrete has been provided for in the design.
   (B) Live Load: AASHTO HL-93 Truck Loading
   (C) Seismic Loads: Acceleration coefficient – 0.8
   Seismic Performance Zone – 4
   Importance Category – Essential
   Soil Profile – Type I
   (D) Utility Load: An allowance of 150 PLF on Each Side of the Bridge for Utility Loads has been provided for in the design.
4. Materials:
   (A) All concrete strengths shall be as noted below:

Item No.	Structural Parts	Classes of Concrete	Specified Compressive Strength, f'c (28 Days)
(1)	Pre-stressed planks	–	6000 PSI
(2)	Abutment Wall Footings, Pier Wall Footings, Wing Wall Footings	–	5000 PSI
(3)	Abutment Walls, Pier Walls and Wing Walls, Retaining walls including foundations	–	5000 PSI
(4)	Rails	–	4000 PSI
(5)	Bridge Deck	–	5000 PSI
(6)	Approach Slab	–	4000 PSI
(7)	Except as noted otherwise all others	A	3000 PSI

   All concrete with the exception of Class A and Class D concrete shall have a maximum W/C Ratio of 0.45. The W/C Ratio for Class A and Class D Concrete shall follow the standard specifications.
   (B) Tetraguard AS20 shrinkage reducing admixture shall be included in the concrete mix for the deck topping, in the edge beams on both sides of the bridge, in the end beams over the pier and abutment walls, and in the concrete posts and railings on the bridge. The required dosage shall be 96 ounces per cubic yard of concrete and follow all manufacturer's recommendations.
   1
   (C) All reinforcing steel shall be ASTM A 615 Grade 60 unless otherwise noted.
   (D) Reinforcing steel shall be ASTM A 706 where welded connections are required.
   (E) All structural steel shall be ASTM A 36 hot dip galvanized after fabrication, unless otherwise noted.
   (F) All anchor bolts, washers and nuts shall be ASTM A 307 hot dip galvanized after fabrication, unless otherwise specified.
   (G) For materials of prestressed concrete planks see applicable prestressed concrete notes.
5. Reinforcement:
   (A) The minimum covering measured from the surface of the concrete to the face of any reinforcing bars shall be as follows, except as otherwise shown:
   (1) Deck slabs
   A. Top bars = 2"
   B. Bottom bars = 1 1/2" except as otherwise noted.
   (2) For prestressed concrete planks see prestressed concrete plank details.
   (3) Retaining walls = 2"
   (4) Abutment Walls, Pier Walls, Wing Walls = 3" to ties or outermost reinforcing
   (5) Approach slab top bars = 2"
   Approach slab bottom bars = 3"
   (6) Concrete cast against and permanently exposed to earth = 3"
   (7) All others unless otherwise noted = 2".
   (B) Reinforcing bars shall be detailed in accordance with the latest edition of the A.C.I. Detailing Manual unless otherwise noted.
   (C) Minimum clear spacing between parallel bars shall be 1 1/2 times the diameter of bars (for non bundled bars). In no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate.
   (D) All dimensions relating to reinforcing bars 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) Vertical wall bars shall be arranged in such a manner as to avoid interference with plank and topping bars above as directed by the Engineer.
6. Plank Bearings:
   (A) Plank concrete bearing seats shall be poured monolithically with supporting structure. Top of concrete bearing seat shall be finished with a steel trowel to a smooth level surface to the elevation shown on the plans. Grind down high spots as needed to provide an even bearing surface to 1/16"± tolerance.
7. Construction Notes:
   (A) See Standard Specifications and Special Provisions.
   (B) In general, top of concrete deck slab shall be constructed to follow the roadway vertical and horizontal curves and superelevations.
   (C) Except as otherwise noted, all vertical dimensions are measured plumb.
   (D) The Contractor shall verify all site conditions and not rely upon these plans for stream location, etc. Conditions may differ from those shown.
   (E) The Contractor shall verify the location of all utility lines and notify the respective owners before commencing with excavation, and any temporary piling or sheeting.
   (F) For concrete finish see Standard Specifications and Special Provisions.
   (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".
   (J) Contractor shall verify footing elevations before fabricating footing and wall reinforcing.

   General:
8. (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.

   Foundation:
   (A) For boring logs and other geotechnical information, see foundation report by Geolabs, Inc. and Sheets AG1 through AG9.
   (B) General:
9. (1) Footings are located in or near the Ordinary High Water Mark (OHWM), see BMP sheets. Construction at these locations may be complicated by the presence of water and cobbles or boulders. Additionally, the stream is subject to flash flooding. Shoring of the excavation may be required for the construction of these footings.
   (2) The pay limits for excavation for the Ford Crossing Structures, shown on sheets no. AS4.16, AS5.4 and AS5.5 should not be considered as indicative of actual excavation requirements.
   (C) Design Soil / Rock Parameters:
   (1) Bearing pressure on basalt rock
   A. Extreme event limit state = 60 ksf
   B. Strength limit state = 36 ksf
   C. Service limit state = 20 ksf
   (2) Passive resistance of intact rock
   A. Extreme event limit state = 35 ksf (rectangular distribution)
   B. Strength limit state = 17.5 ksf (rectangular distribution)
   (3) Coefficient of friction of basalt rock
   A. Extreme event limit state = 0.75
   B. Strength limit state = 0.64
   (4) Side shear between concrete and intact basalt rock
   A. Extreme event limit state = 2 ksf
   (5) Passive spring resistance for Type A structure backfill at abutments
   A. Extreme event limit state = 30 ksf/inch with 1 inch maximum deflection
   (6) Static lateral earth pressure
   A. Active condition, level backfill = 35 pcf
   B. Active condition, 2H : 1V backfill = 50 pcf
   C. At-rest condition, level backfill = 50 pcf
   D. At-rest condition, 2H : 1V backfill = 65 pcf
   (7) Dynamic lateral earth pressure
   A. Level backfill = $120H^2$ plf (rectangular distribution) (for abutment walls)
   B. Level backfill = $36H^2$ plf (rectangular distribution) (for wingwalls and site retaining walls)
   (D) Blasting will not be allowed on this project.
10. Reference Drawings:
   (A) For construction sequence, see Sheet AS10.1.

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DATE		DESCRIPTION
7-31-01	1	Revise note

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE GENERAL NOTES

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS0.3 OF 49 SHEETS

ADD. 33

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	34	145

SYMBOLS AND ABBREVIATIONS

@	At
≥	Greater than
Abut.	Abutment
Alt.	Alternate
Approx.	Approximate
Az.	Azimuth
Bal.	Balance
Beg.	Begin
Bet.	Between
Bm.	Beam
Bot.	Bottom
Brg.	Bearing
℄	Center line
CIP	Cast in place
Cl., clr.	Clear
CLSM	Controlled Low Strength Material
Conc.	Concrete
Col.	Column
Cont.	Continue
Corresp.	Corresponding
CRM	Cement Rubble Masonry
CY	Cubic yards
Det.	Detail
Dim.	Dimension
Ea.	Each
EF	Each face
El., elev.	Elevation
Eq.	Equal, equally
EW	Each way
Exc.	Excavation
Exist.	Existing
Exp.	Expansion
f'c	Specified compressive strength (28 days)
FA	Force account
FF	Front face
Fin.	Finish
Ft.	Foot, feet
Ftg.	Footing
Galv.	Galvanize
Gr., grd.	Ground, grade
H, h	Height
Horiz.	Horizontal
HS	High strength
Hwy.	Highway
Int.	Interior
Inv.	Invert
Jt.	Joint
L	Length
Lbs.	Pounds
LF	Linear foot
Longit.	Longitudinal
LS	Lump sum
Max.	Maximum
Min.	Minimum
No., #	Number
OC, oc	On center
P(e)	Effective Prestress Force
Psf.	Pounds per square foot
Psi.	Pounds per square inch
R	Radius
Rdwy.	Roadway
Ref.	Reference
Reinf.	Reinforcement
Req., Req'd.	Required
Ret.	Retaining
Sect.	Section
SF	Square foot
Sht.	Sheet
Spcg.	Spacing
Spcs.	Spaces
Sta.	Station
Std.	Standard
Stirr.	Stirrup
Str.	Stream
Struct.	Structure
Symm.	Symmetrical
Transv.	Transverse
Typ.	Typical
Vert.	Vertical
W/C	Water/Cement Ratio
WW	Wingwall

ORIGINAL PLAN
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SYMBOLS AND ABBREVIATIONS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

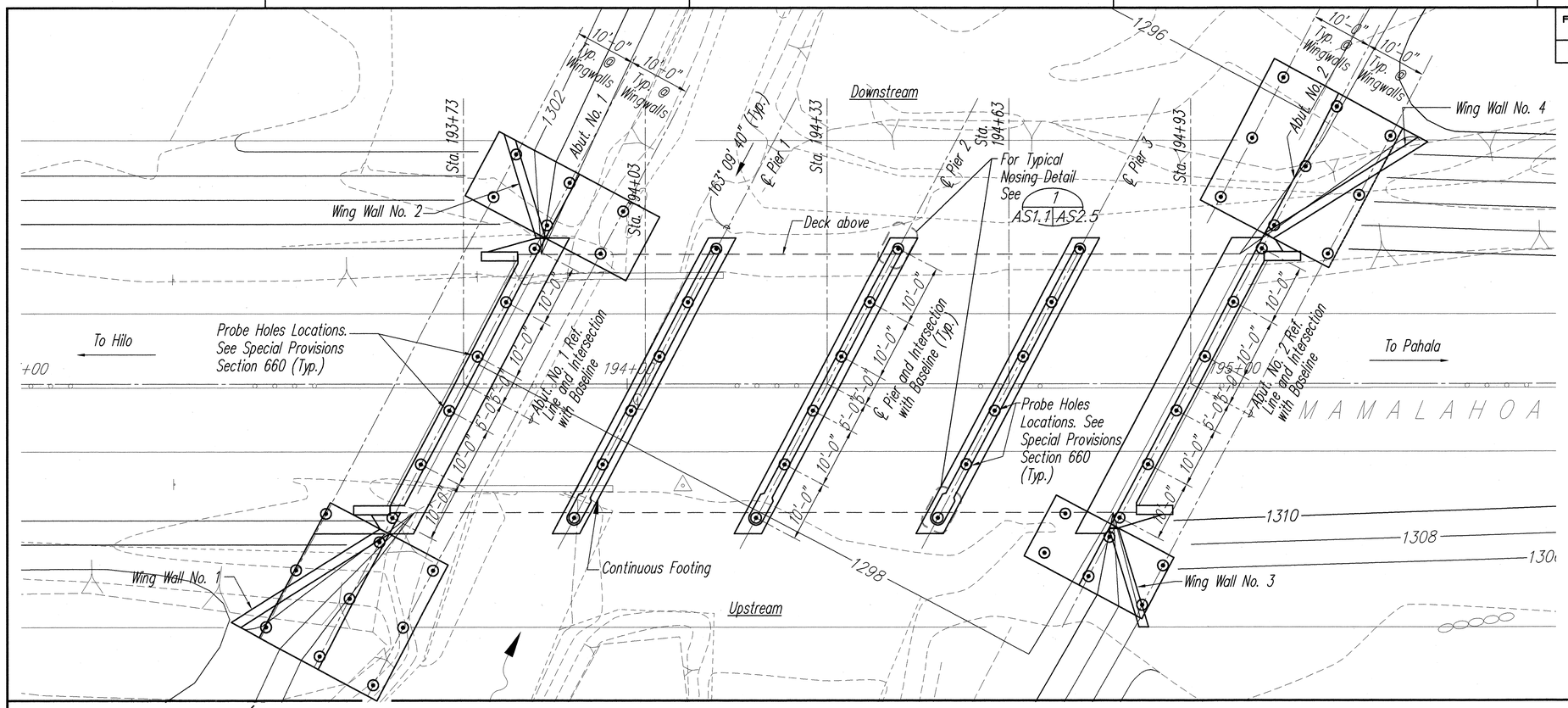
Scale: As Noted Date: Feb. 2001

SHEET No. AS0.4 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	35	145

LEGEND

⊙ Probe Holes Locations. See Special Provisions Section 660 (Typ.)



FOUNDATION LAYOUT PLAN

Scale: 1" = 10'-0"

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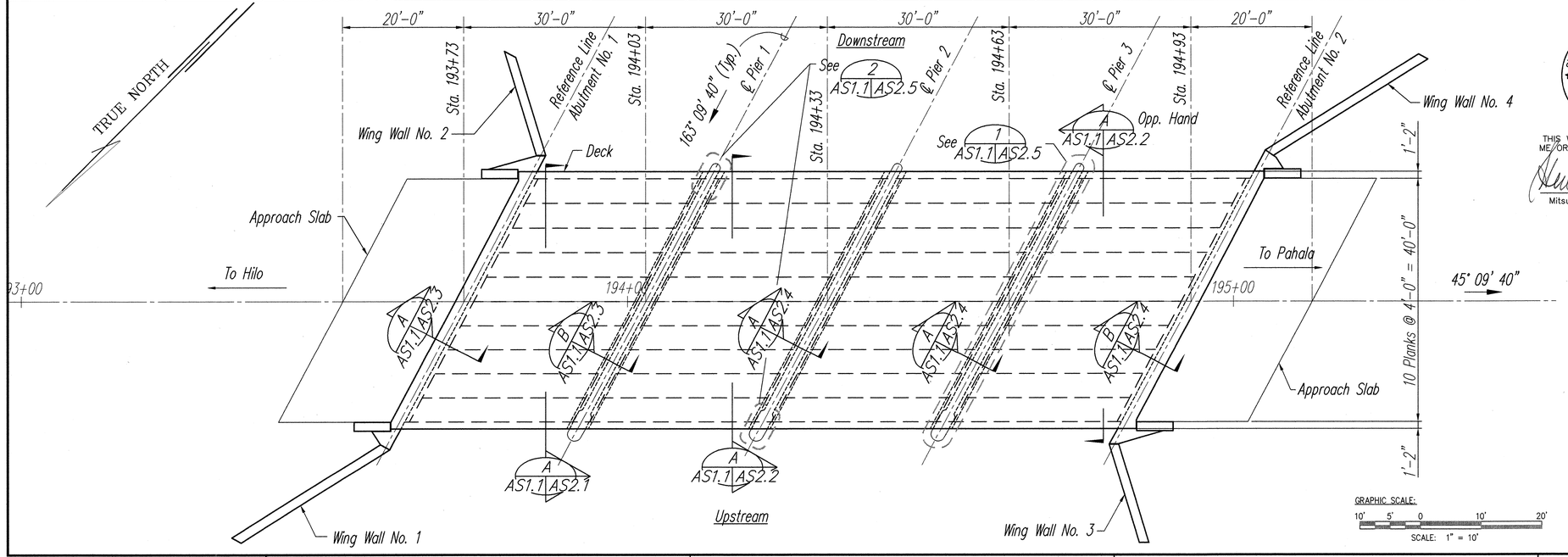

DECK LAYOUT PLAN

Scale: 1" = 10'-0"

GRAPHIC SCALE:
10' 5' 0 10' 20'
SCALE: 1" = 10'

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DATE DEC2000
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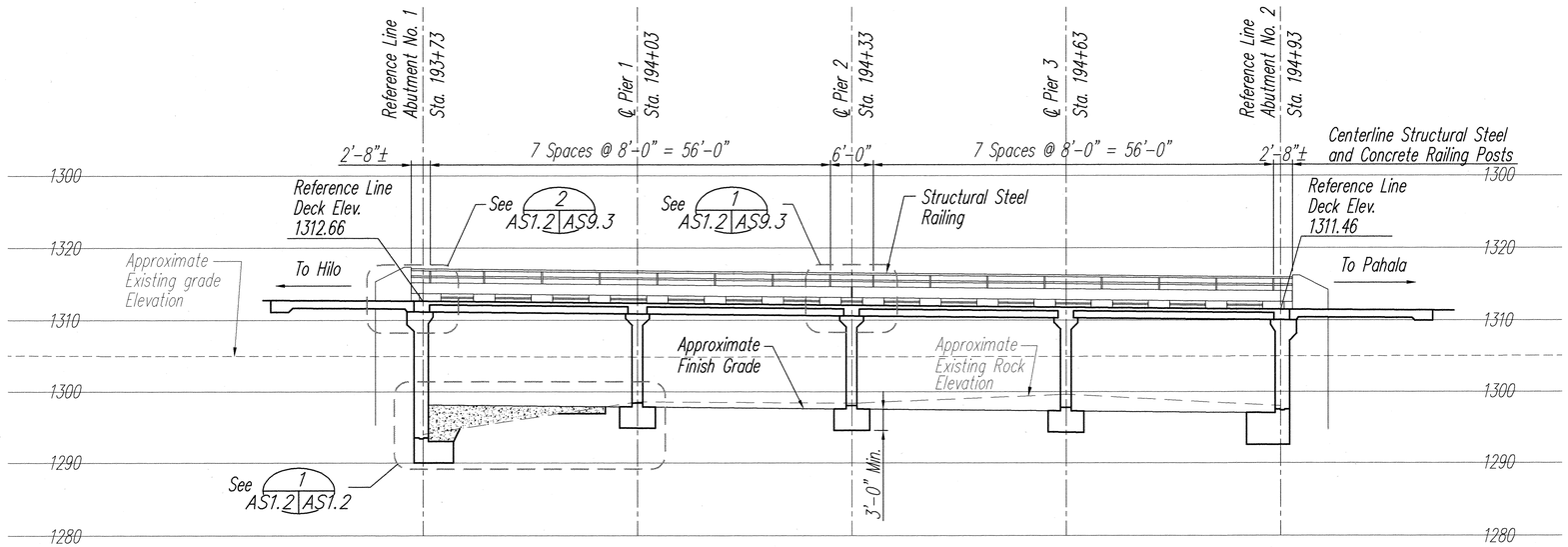
STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FOUNDATION LAYOUT PLAN
AND DECK LAYOUT PLAN
MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

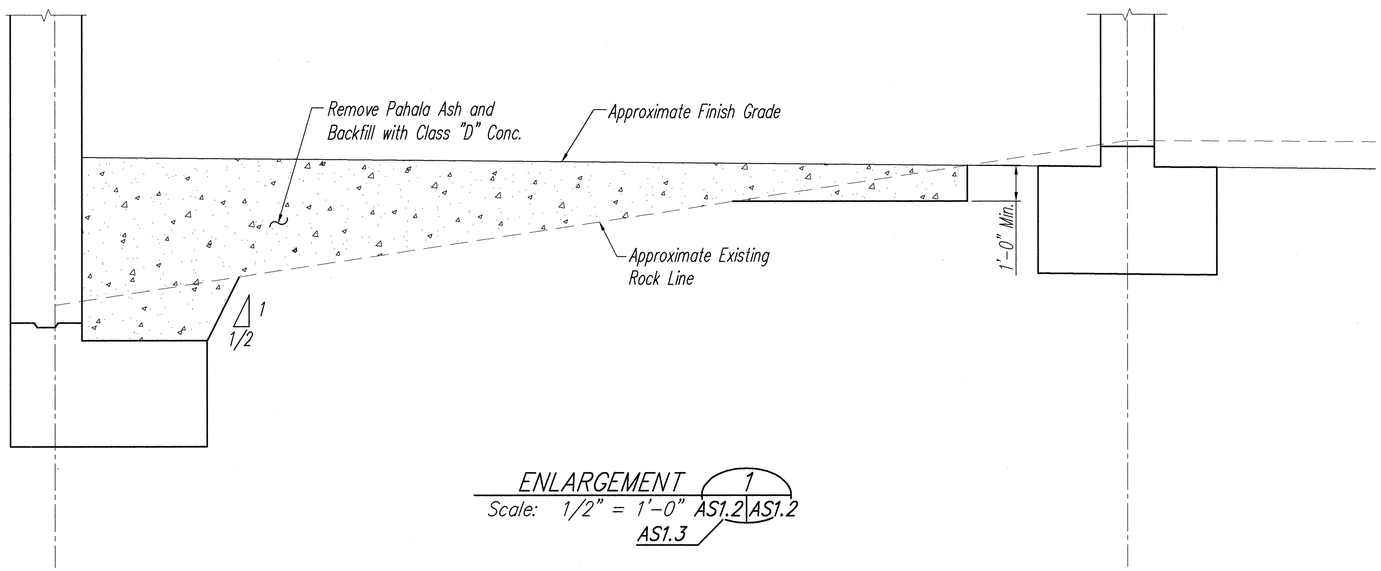
SHEET No. AS1.1 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	36	145



LONGITUDINAL SECTION ALONG CENTERLINE STRUCTURE

Scale: 1" = 10'-0"



ENLARGEMENT 1

Scale: 1/2" = 1'-0" AS1.2 | AS1.2

AS1.3

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ORIGINAL PLAN
NOTE BOOK No. ____

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GRAPHIC SCALE:
10' 5' 0 10' 20'
SCALE: 1" = 10'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

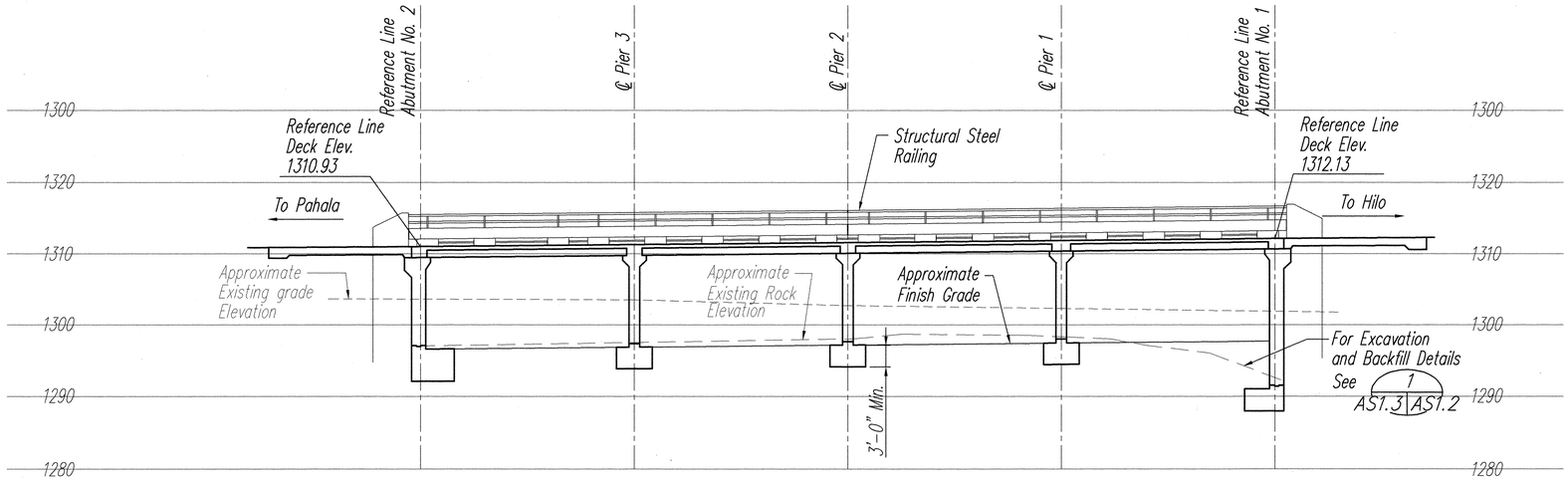
LONGITUDINAL SECTION ALONG CENTERLINE STRUCTURE

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

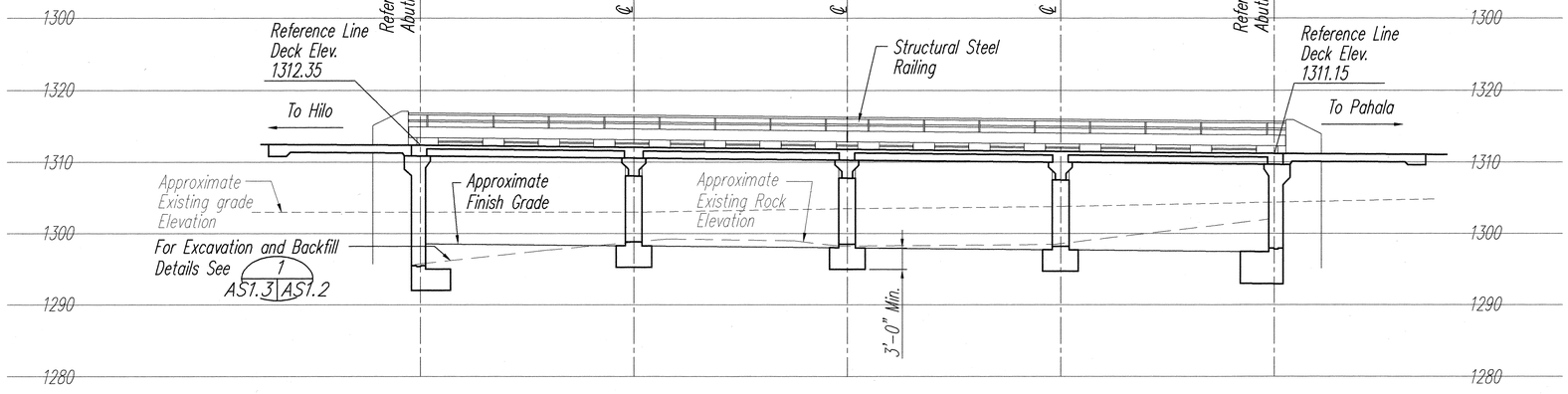
SHEET No. AS1.2 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	37	145



DOWNSTREAM ELEVATION

Scale: 1" = 10'-0"



UPSTREAM ELEVATION

Scale: 1" = 10'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE DEC2000
	DRAWN BY JST	
NOTE BOOK	TRACED BY " " " "	
	DESIGNED BY KSF	
No.	QUANTITIES BY	
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GRAPHIC SCALE:
10' 5' 0 10' 20'
SCALE: 1" = 10'

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

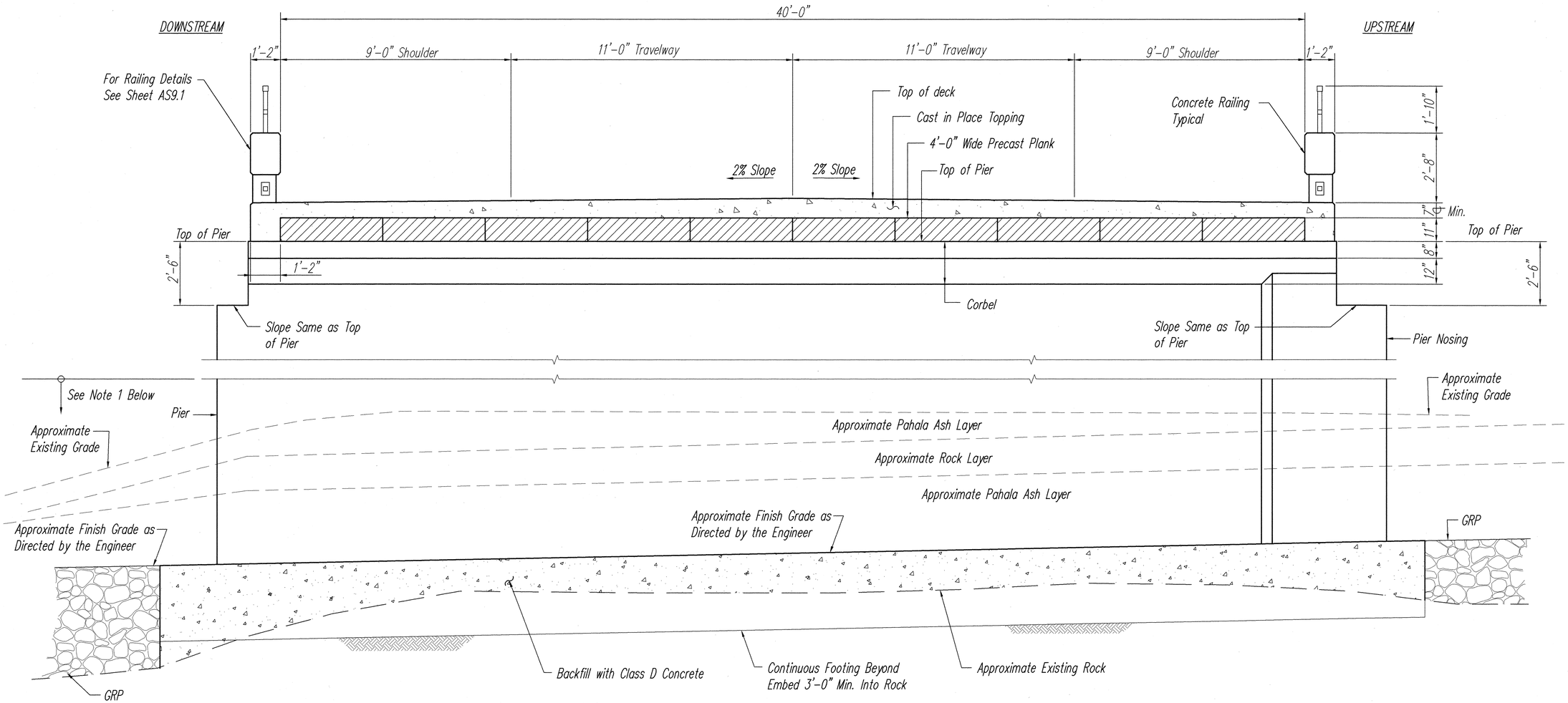
BRIDGE ELEVATIONS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS1.3 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	38	145



Notes:

1. Section below cut mark drawn for illustrative purposes.
2. For Structural Excavation and Backfill Pay Limits, see Sheet AS5.4 and AS5.5

NORMAL DECK SECTION BETWEEN ABUT NO. 1 & PIER NO. 1

A

Scale: 1/2" = 1'-0" AS1.1 AS2.1

ORIGINAL PLAN
NOTE BOOK
No.

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CHECKED BY
DATE DEC2000

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KSF, Inc.

GRAPHIC SCALE:
1' 0 1' 2' 3' 4' 5' 6'
SCALE: 1/2" = 1'-0"

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

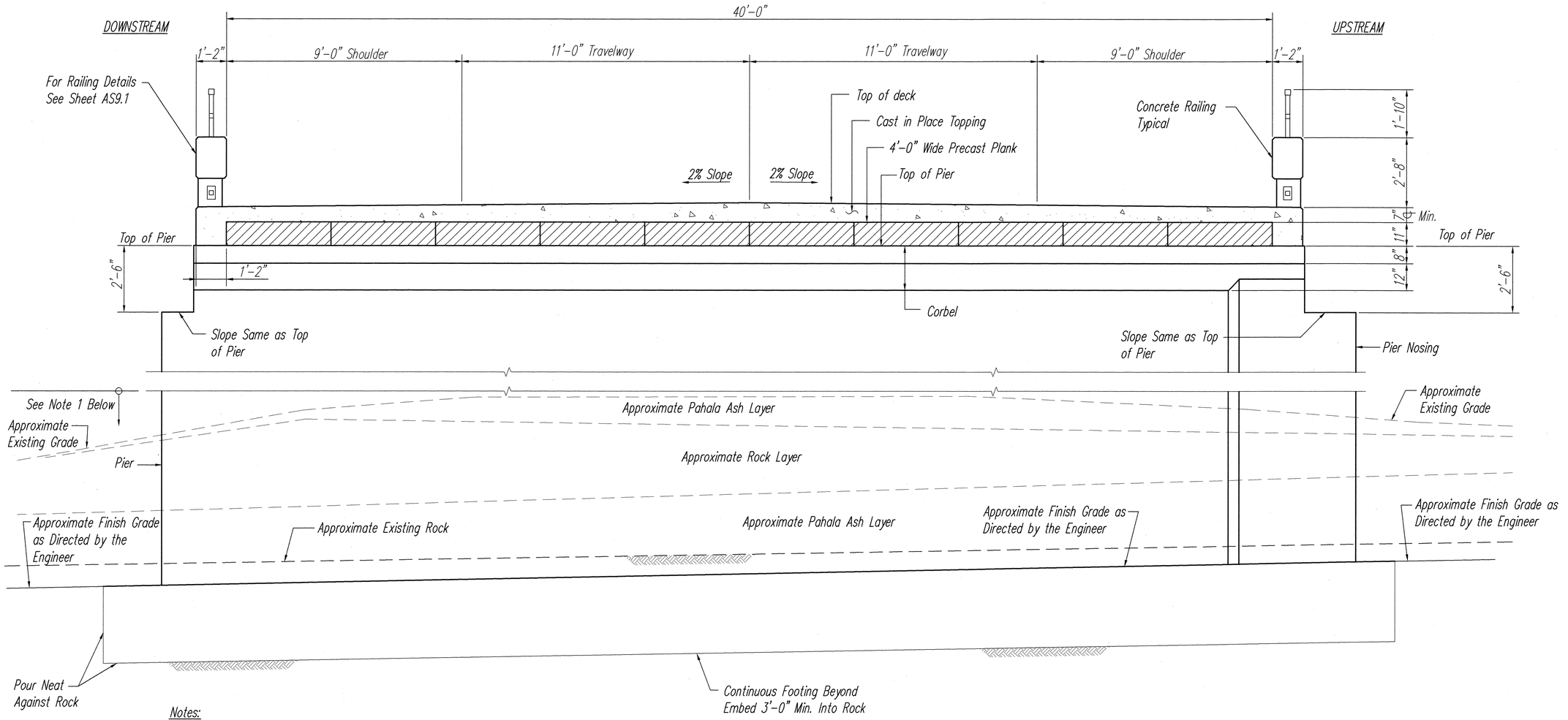
NORMAL DECK SECTION

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS2.1 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	39	145



Notes:

1. Section below cut mark drawn for illustrative purposes.
2. For Structural Excavation and Backfill Pay Limits, see Sheet AS5.4 and AS5.5

NORMAL DECK SECTION BETWEEN PIER 1 AND ABUTMENT 2 (A)

Scale: 1/2" = 1'-0" AS1.1 AS2.2

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE DEC2000
	DRAWN BY VSY	
	TRACED BY VSY	
NOTE BOOK	DESIGNED BY KSF	
	QUANTITIES BY	
No.	CHECKED BY	

DAVID K. FUJIWARA ★ LICENSED PROFESSIONAL ENGINEER ★ NO. 8104-S ★ HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE: 1' 0 1' 2' 3' 4' 5' 6'

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

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

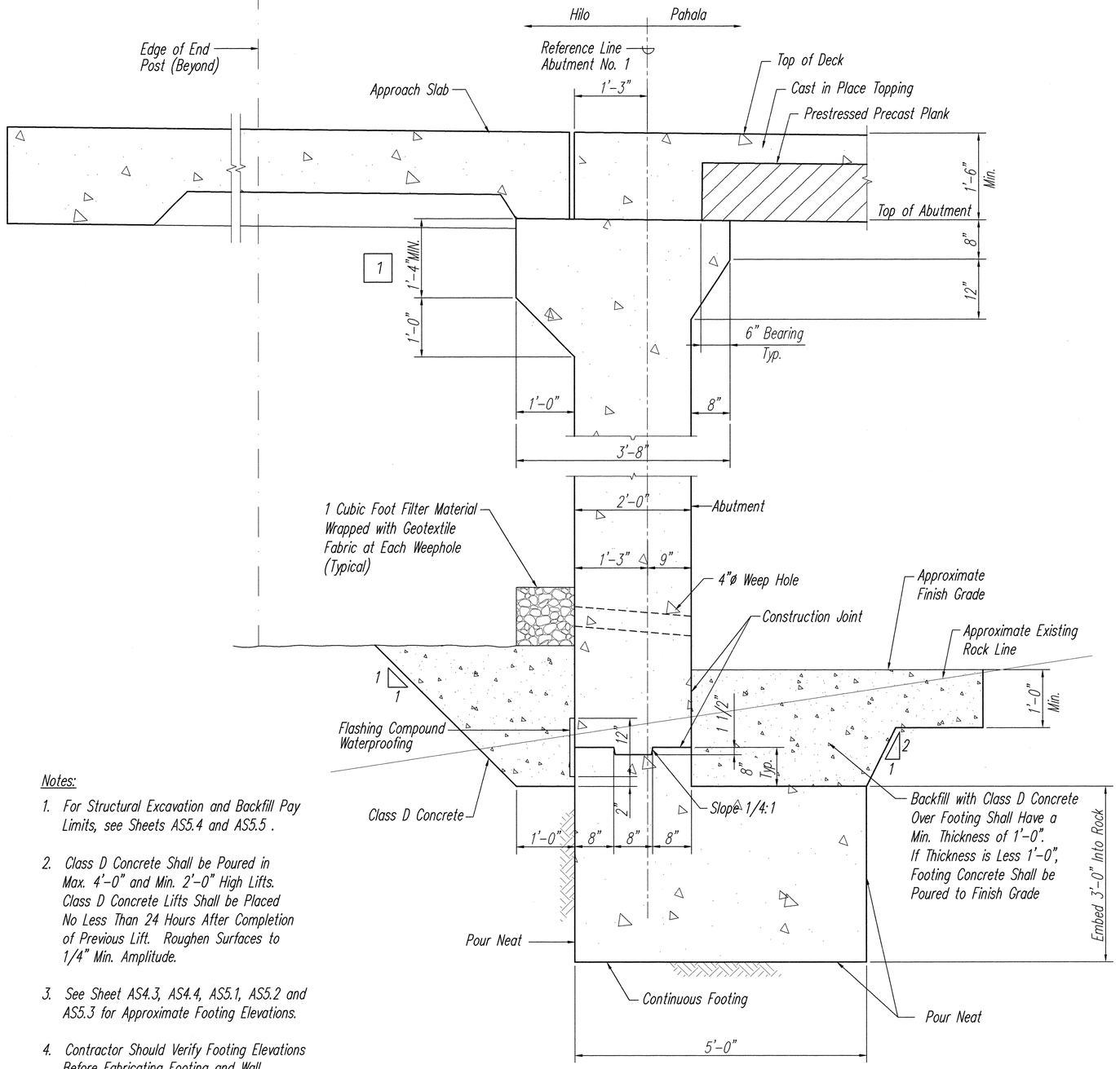
NORMAL DECK SECTION

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

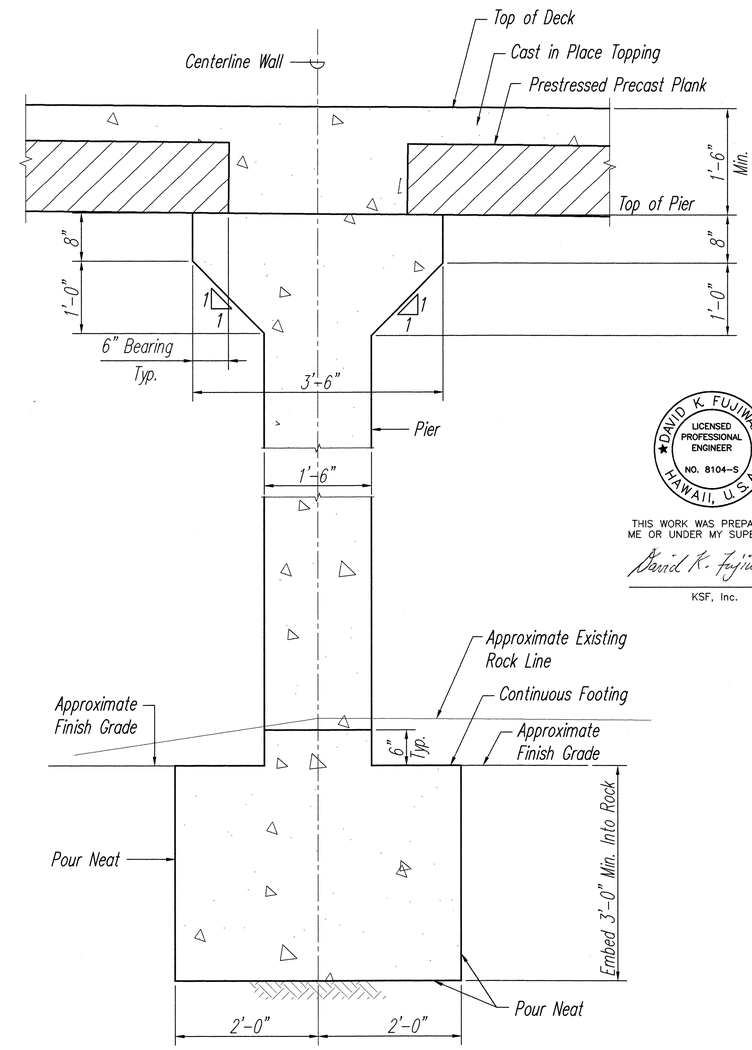
SHEET No. AS2.2 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	ADD. 40	145



TYPICAL SECTION – ABUT. NO. 1 (A)

Scale: 1" = 1'-0" AS1.1 AS2.3 AS2.4



TYPICAL SECTION – PIER 1 (B)

Scale: 1" = 1'-0" AS1.1 AS2.3

Notes:

1. For Structural Excavation and Backfill Pay Limits, see Sheets AS5.4 and AS5.5 .
2. Class D Concrete Shall be Poured in Max. 4'-0" and Min. 2'-0" High Lifts. Class D Concrete Lifts Shall be Placed No Less Than 24 Hours After Completion of Previous Lift. Roughen Surfaces to 1/4" Min. Amplitude.
3. See Sheet AS4.3, AS4.4, AS5.1, AS5.2 and AS5.3 for Approximate Footing Elevations.
4. Contractor Should Verify Footing Elevations Before Fabricating Footing and Wall Reinforcing.

DAVID K. FUJIWARA ★ LICENSED PROFESSIONAL ENGINEER ★ NO. 8104-S ★ HAWAII, U.S.A.

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David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE: 1' 6" 0 1' 2' SCALE: 1" = 1'-0"

DATE	DESCRIPTION
07-31-01	1 Revised Dimension

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL ABUTMENT AND PIER SECTIONS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

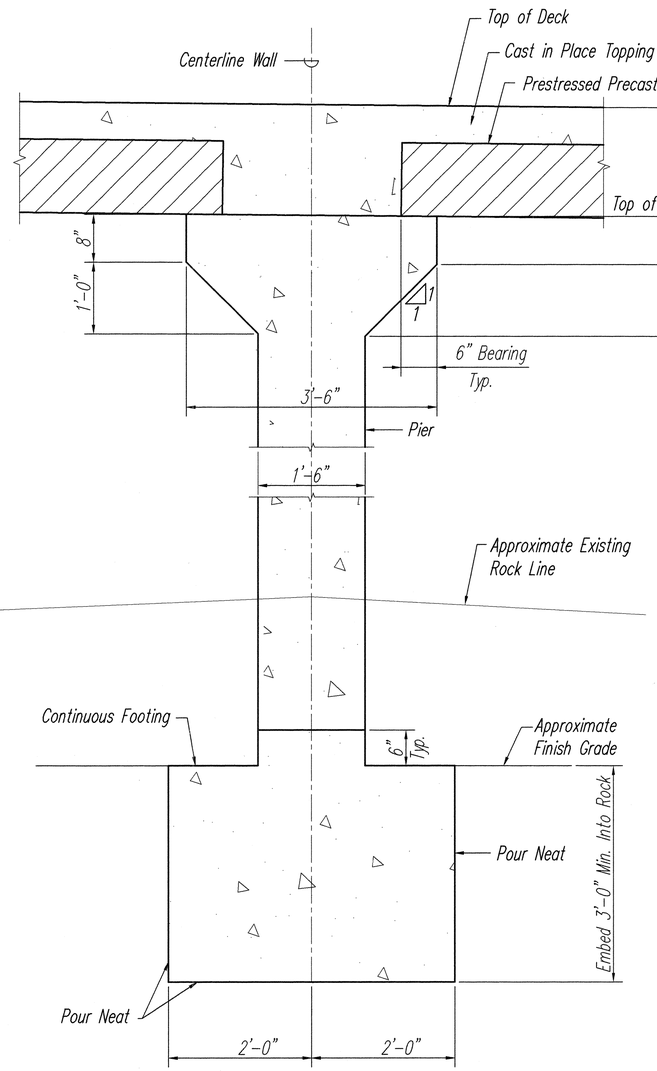
Scale: As Noted Date: Feb. 2001

SHEET No. AS2.3 OF 49 SHEETS

ADD. 40

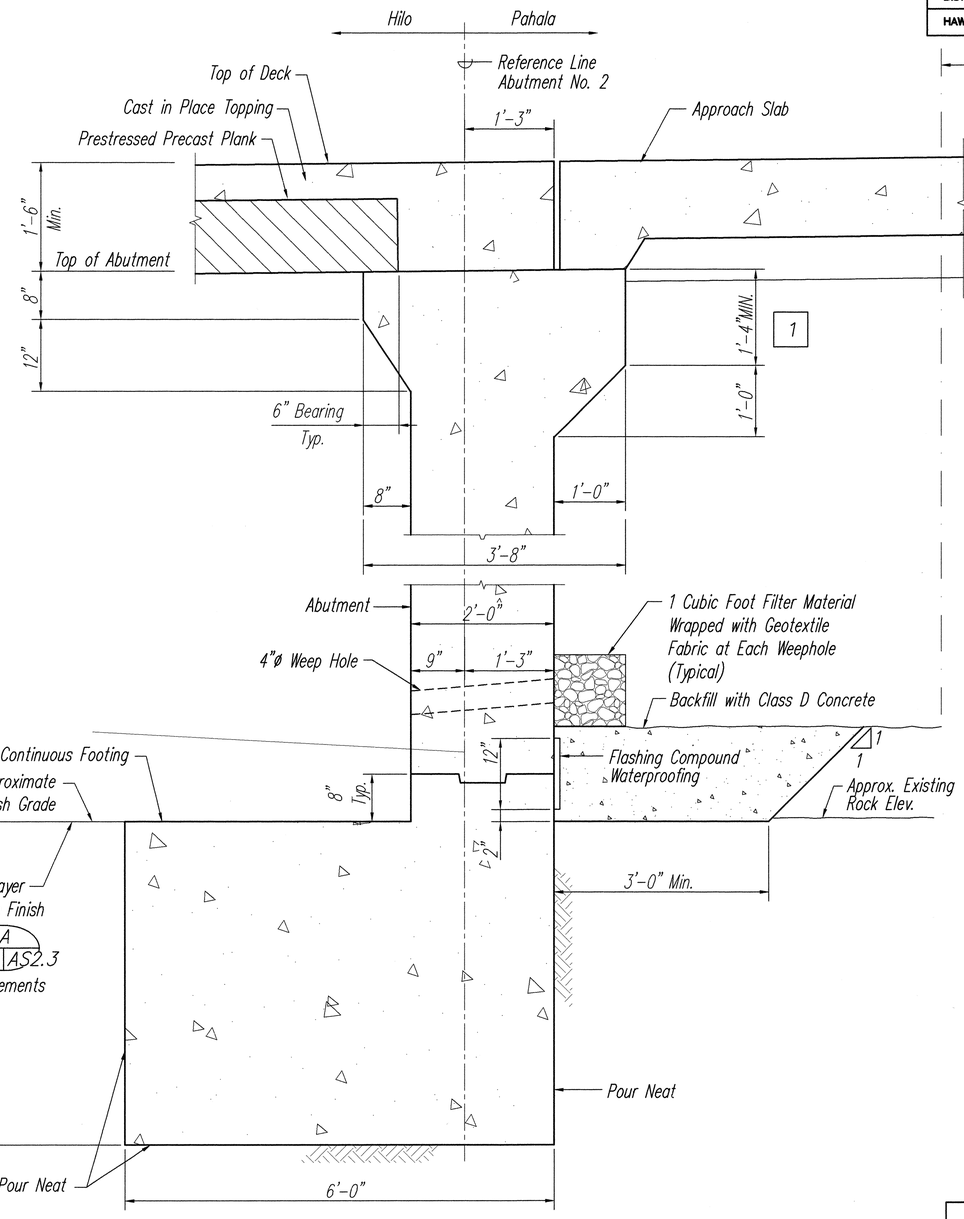
ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE Jan. 2001
NOTE BOOK
No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	ADD. 41	145



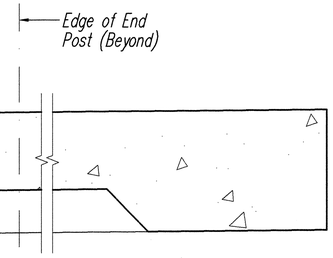
TYPICAL SECTION – PIERS 2 & 3 (A AS1.1 | AS2.4)

Scale: 1" = 1'-0"



TYPICAL SECTION – ABUT. NO. 2 (B AS1.1 | AS2.4)

Scale: 1" = 1'-0"



Notes:

1. For Structural Excavation and Backfill Pay Limits, see Sheets AS5.4 and AS5.5 .
2. Class D Concrete Shall be Poured in Max. 4'-0" and Min. 2'-0" High Lifts. Class D Concrete Lifts Shall be Placed No Less Than 24 Hours After Completion of Previous Lift. Roughen Surfaces to 1/4" Min. Amplitude.
3. See Sheet AS4.3, AS4.4, AS5.1, AS5.2 and AS5.3 for Approximate Footing Elevations.
4. Contractor Should Verify Footing Elevations Before Fabricating Footing and Wall Reinforcing.

DAVID K. FUJIWARA LICENSED PROFESSIONAL ENGINEER NO. 8104-S HAWAII, U.S.A.

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David K. Fujiwara

KSF, Inc.

ORIGINAL PLAN
NOTE BOOK No. ____
SURVEY PLOTTED BY ____ DATE Jan. 2001
DRAWN BY AST " " "
TRACED BY " " "
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

DATE	DESCRIPTION
07-31-01	1 Revised Dimension

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL ABUTMENT AND PIER SECTIONS

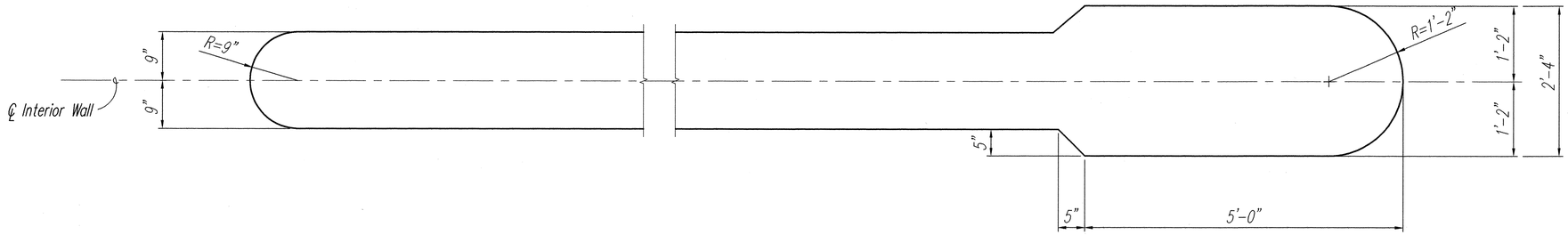
MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS2.4 OF 49 SHEETS

ADD. 41

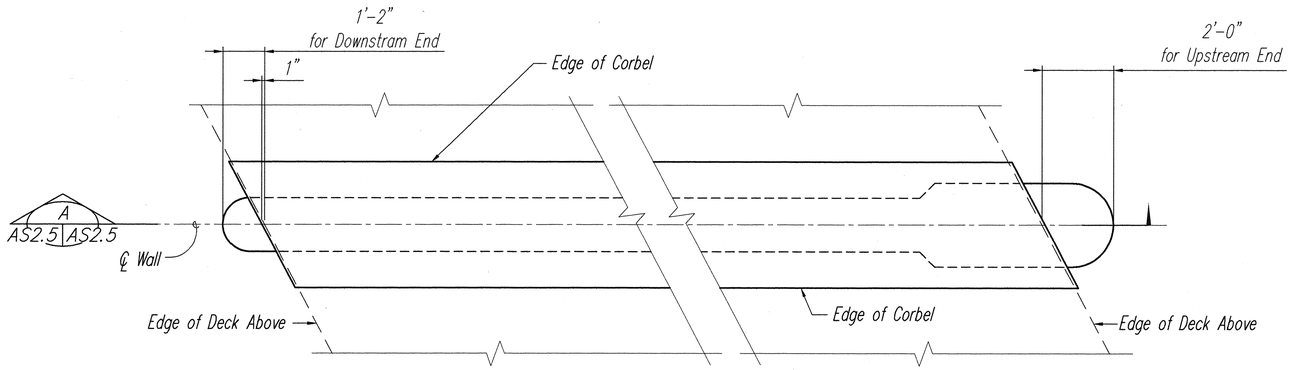
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	42	145



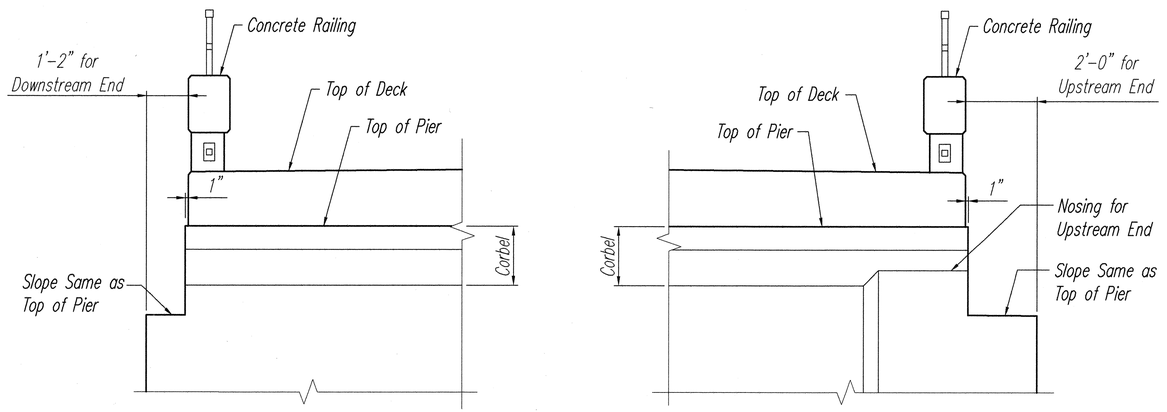
DOWNSTREAM NOSING DETAIL

UPSTREAM BUMPER NOSING DETAIL

TYPICAL NOSING PLAN (1) AS1.1 | AS2.5
Scale: 1" = 1'-0"



CORBEL DETAIL AT PIERS 1, 2 & 3 (2) AS1.1 | AS2.5
Scale: 1/2" = 1'-0"



SECTION (A) AS2.5 | AS2.5
Scale: 1/2" = 1'-0"

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY KSF
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE Jan. 2001

DAVID K. FUJIWARA ★ LICENSED PROFESSIONAL ENGINEER ★ NO. 8104-S ★ HAWAII, U.S.A.

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David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DETAILS, SECTIONS AND NOSING PLAN

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS2.5 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	43	145

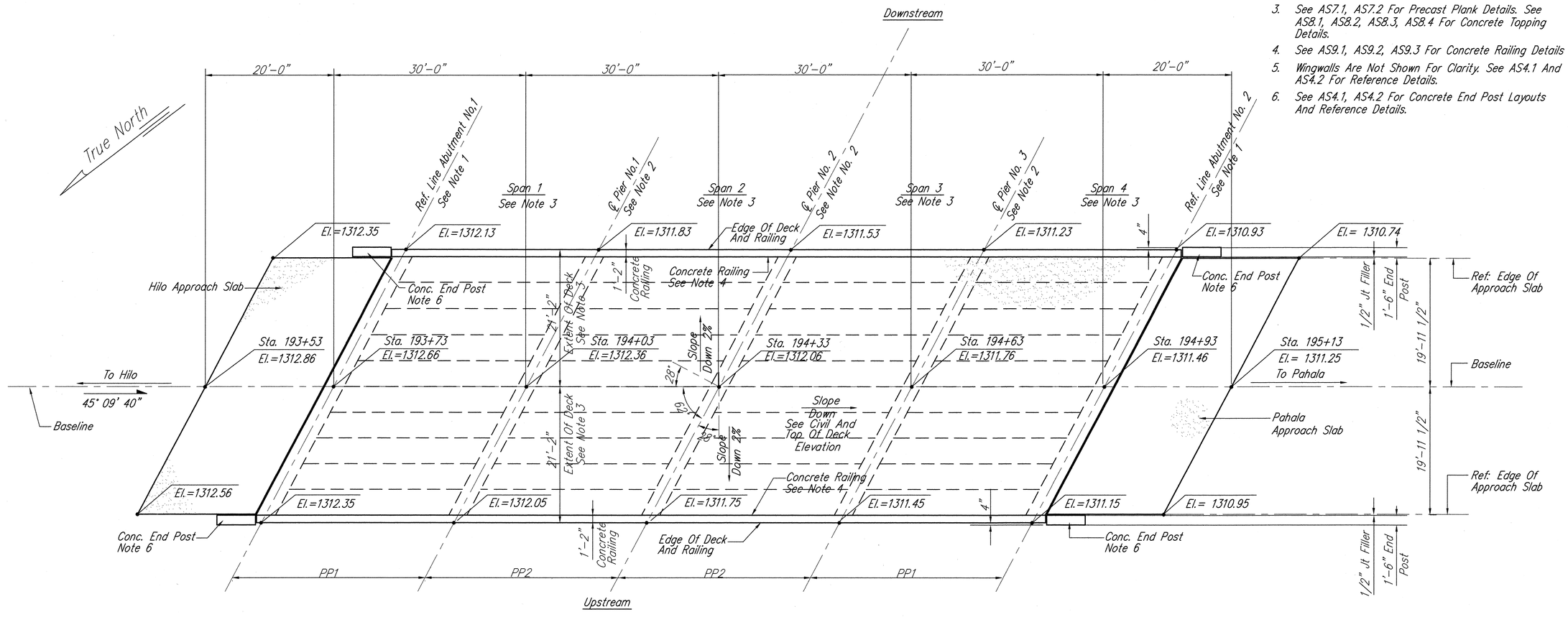
Legend:

Sta. 194+33
El. = 1312.08 — Reference Station And Top Of Deck Elevation

PP1 — Precast Plank Type

Note:

1. Reference Line At Abutments Nos. 1 And 2 Are Offset From the Abutment Wall Centerlines. Refer To Sheets AS3.2, AS4.1 And AS4.2 For Details.
2. See AS3.2 For Pier Layout.
3. See AS7.1, AS7.2 For Precast Plank Details. See AS8.1, AS8.2, AS8.3, AS8.4 For Concrete Topping Details.
4. See AS9.1, AS9.2, AS9.3 For Concrete Railing Details
5. Wingwalls Are Not Shown For Clarity. See AS4.1 And AS4.2 For Reference Details.
6. See AS4.1, AS4.2 For Concrete End Post Layouts And Reference Details.



TOP OF DECK ELEVATION PLAN

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

A
AS3.1 | AS3.1

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

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David K. Fujiwara

KSF, Inc.

STEWART N. WILLIAMS ★ LICENSED PROFESSIONAL ENGINEER ★ NO. 3908-S ★ HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Mitsunaga & Associates, Inc.

8 6 4 2 0 8 16

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

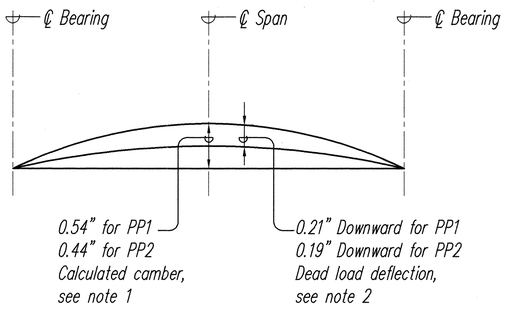
TOP OF DECK ELEVATION PLAN

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

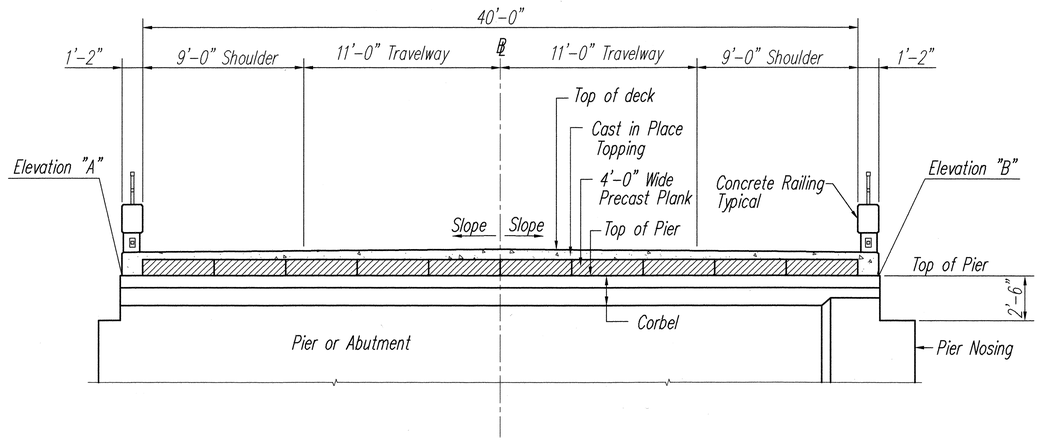
SHEET No. AS3.1 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	44	145



LOCATION	ELEVATION "A"	ELEVATION "B"
Abut. 1	1310.56	1310.78
Pier 1	1310.26	1310.48
Pier 2	1309.96	1310.18
Pier 3	1309.66	1309.88
Abut. 2	1309.36	1309.58

DOWNSTREAM UPSTREAM



CAMBER AND DEFLECTION NOTES:

1. The calculated camber includes the effect of the prestress force and the weight of the girder at time of erection. Positive values shown for calculated camber indicate a net upward deflection. The calculated camber value has been multiplied by creep factors to approximate the effect of camber growth and concrete creep. The actual camber shall not exceed the calculated camber by more than 1/2".
2. The dead load deflection is for the weight of the topping.
3. All cambers and deflections are in inches.

GIRDER CAMBER DIAGRAM (1 / S3.2 | S3.2)
Not to Scale

NOTES:

1. Top of Pier and Abutment slopes shall be constant from Elevation "A" to Elevation "B".
2. Top of Pier and Abutment also slope parallel with the bridge and shall have a constant slope of 1% in that direction. The higher elevation is on the Hilo side.
3. Elevations "A" and "B" accounts for camber.
4. Elevations are at centerline Pier and Abutment Reference Line.

NORMAL DECK SECTION AT PIER (A / S3.2 | S3.2)
Scale: 1/4" = 1'-0"

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY JGY
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE JAN2001

DAVID K. FUJIWARA ★ LICENSED PROFESSIONAL ENGINEER ★ NO. 8104-S ★ HAWAII, U.S.A.

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David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE:
1' 0 1' 2' 3' 4' 5' 6'
SCALE: 1/2" = 1'-0"

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

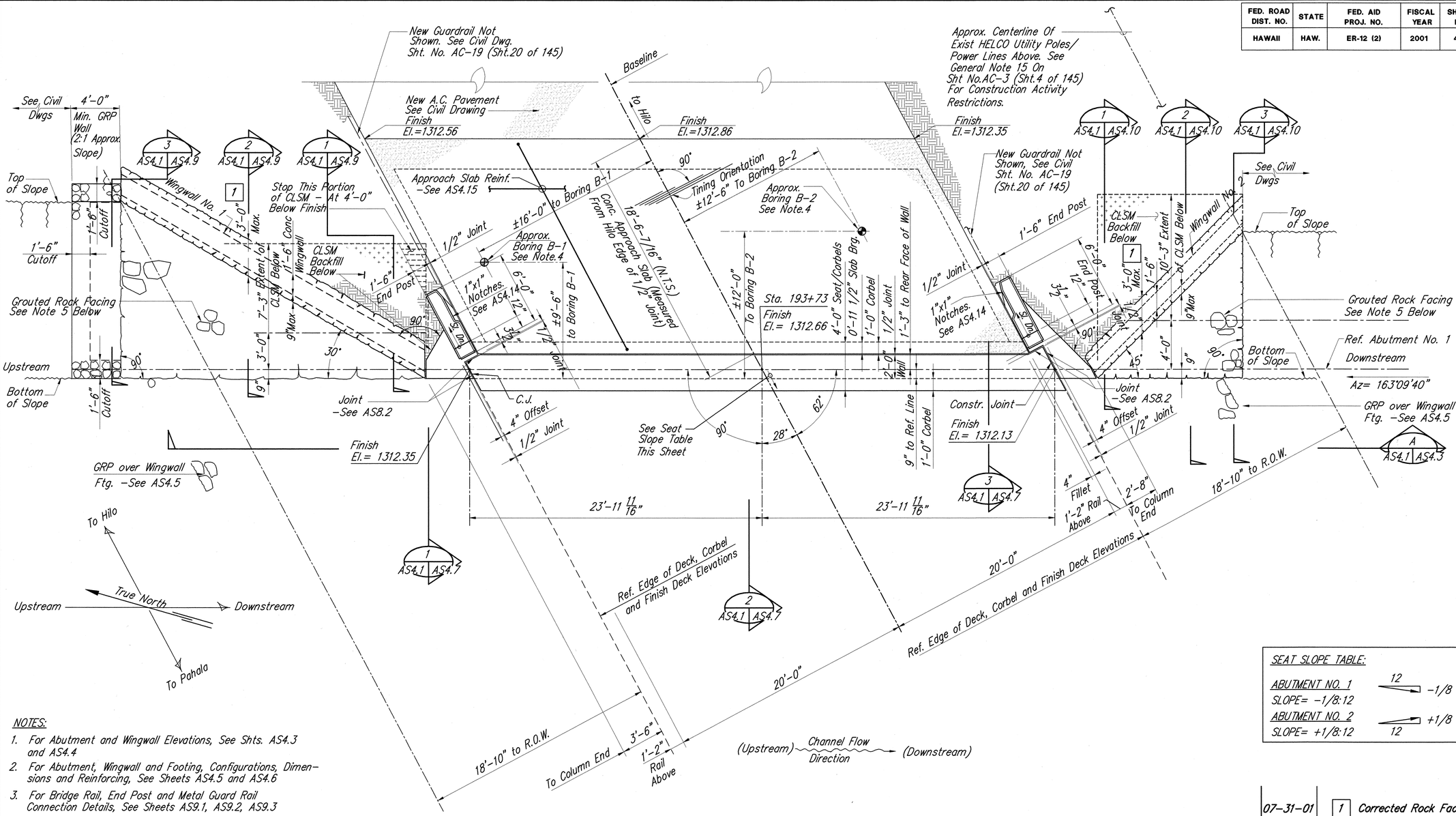
TOP OF PIER ELEVATIONS AND CAMBER DIAGRAM

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS3.2 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	45	145



NOTES:

1. For Abutment and Wingwall Elevations, See Shts. AS4.3 and AS4.4
2. For Abutment, Wingwall and Footing, Configurations, Dimensions and Reinforcing, See Sheets AS4.5 and AS4.6
3. For Bridge Rail, End Post and Metal Guard Rail Connection Details, See Sheets AS9.1, AS9.2, AS9.3
4. Approx. Top Of Basalt: B-1 El.=1295.5, B-2 El.=1293.5
5. Provide 9" Max. Thick Grouted Rock Facing Over Variable Slope Concrete Wingwalls. Anchor Rock Facing To Concrete Wingwalls With Galvanized Steel Strap Ties With powder Actuated Shot Pins At 16" Max. x 16" Max. Grid. See AS4.9 And AS4.10. Finished Facing Shall Match The Appearance Of Adjacent GRP. Grouted Rock Facing Shall Be Incidental To Concrete For Wingwalls.

SEAT SLOPE TABLE:

ABUTMENT NO. 1	12	-1/8
SLOPE= -1/8:12		
ABUTMENT NO. 2		+1/8
SLOPE= +1/8:12	12	

DATE	DESCRIPTION
07-31-01	1 Corrected Rock Facing Extent

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

ABUTMENT NO.1, WINGWALL and END POST LAYOUT (HILO APPROACH)

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

A AS4.3, AS4.7, AS4.9, AS4.10 | AS4.1

4 3 2 1 0 4 8
1/4"= 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO.1, WINGWALL and END POST LAYOUT (HILO APPROACH)

MAMALAHOA HIGHWAY
REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

STEWART N. WILLIAMS* LICENSED PROFESSIONAL ENGINEER No. 3908-S HAWAII, U.S.A.

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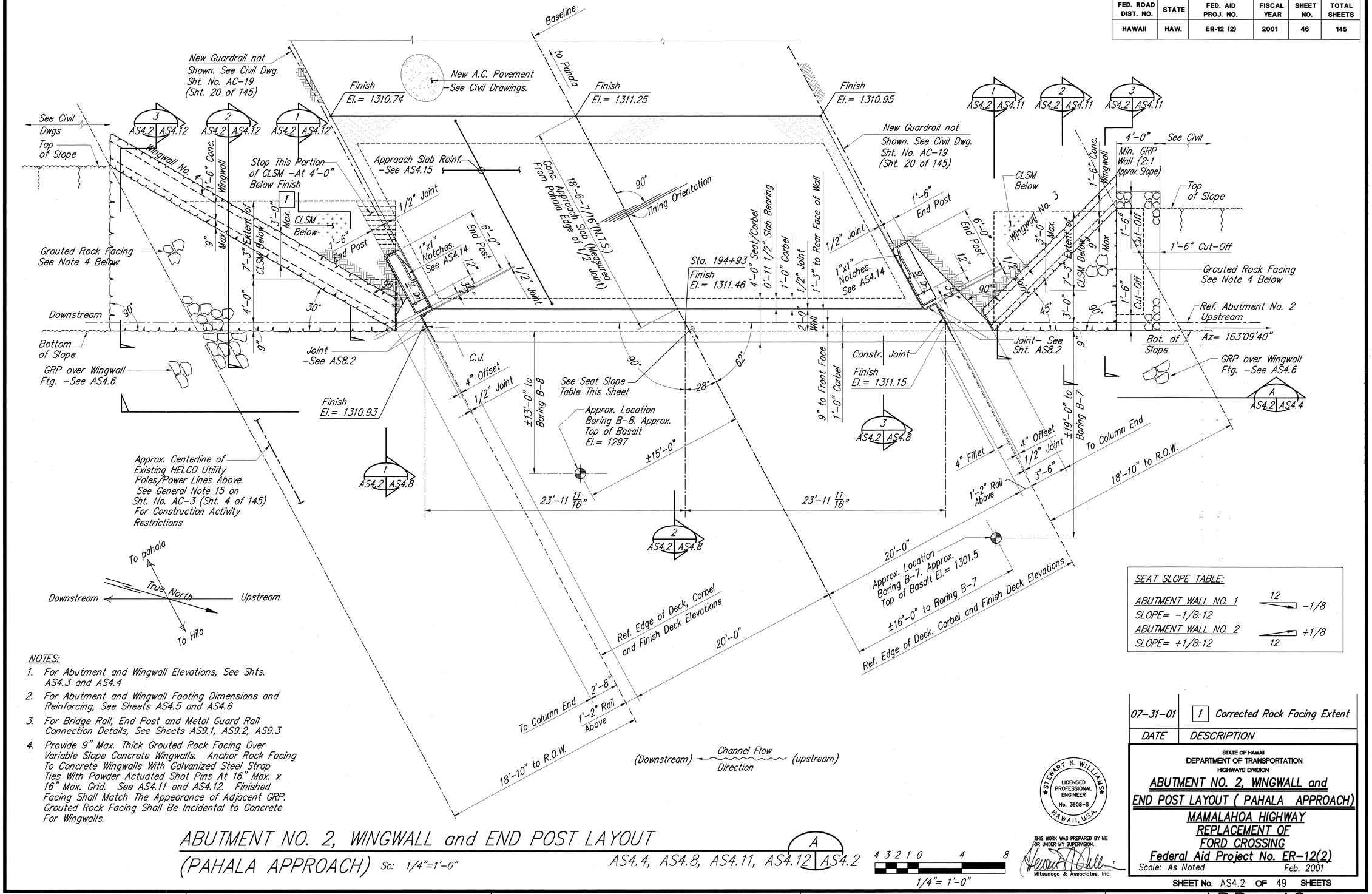
Mitsunaga & Associates, Inc.

SHEET No. AS4.1 OF 49 SHEETS

ADD. 45

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	46	145



SEAT SLOPE TABLE:

ABUTMENT WALL NO. 1 SLOPE= -1/8:12	12 to -1/8
ABUTMENT WALL NO. 2 SLOPE= +1/8:12	+1/8 to 12

NOTES:

1. For Abutment and Wingwall Elevations, See Shts. AS4.3 and AS4.4
2. For Abutment and Wingwall Footing Dimensions and Reinforcing, See Sheets AS4.5 and AS4.6
3. For Bridge Rail, End Post and Metal Guard Rail Connection Details, See Sheets AS9.1, AS9.2, AS9.3
4. Provide 9" Max. Thick Grouted Rock Facing Over Variable Slope Concrete Wingwalls. Anchor Rock Facing To Concrete Wingwalls With Galvanized Steel Strap Ties With Powder Actuated Shot Pins At 16" Max. x 16" Max. Grid. See AS4.11 and AS4.12. Finished Facing Shall Match The Appearance of Adjacent GRP. Grouted Rock Facing Shall Be Incidental to Concrete For Wingwalls.

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

DATE	DESCRIPTION
07-31-01	1 Corrected Rock Facing Extent

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO. 2, WINGWALL and END POST LAYOUT (PAHALA APPROACH)

MAMALAHOA HIGHWAY
REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

STEWART N. WILLIAMS — LICENSED PROFESSIONAL ENGINEER No. 3908-S — HAWAII, U.S.A.

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Mitsunaga & Associates, Inc.

ABUTMENT NO. 2, WINGWALL and END POST LAYOUT (PAHALA APPROACH) Sc: 1/4"=1'-0"

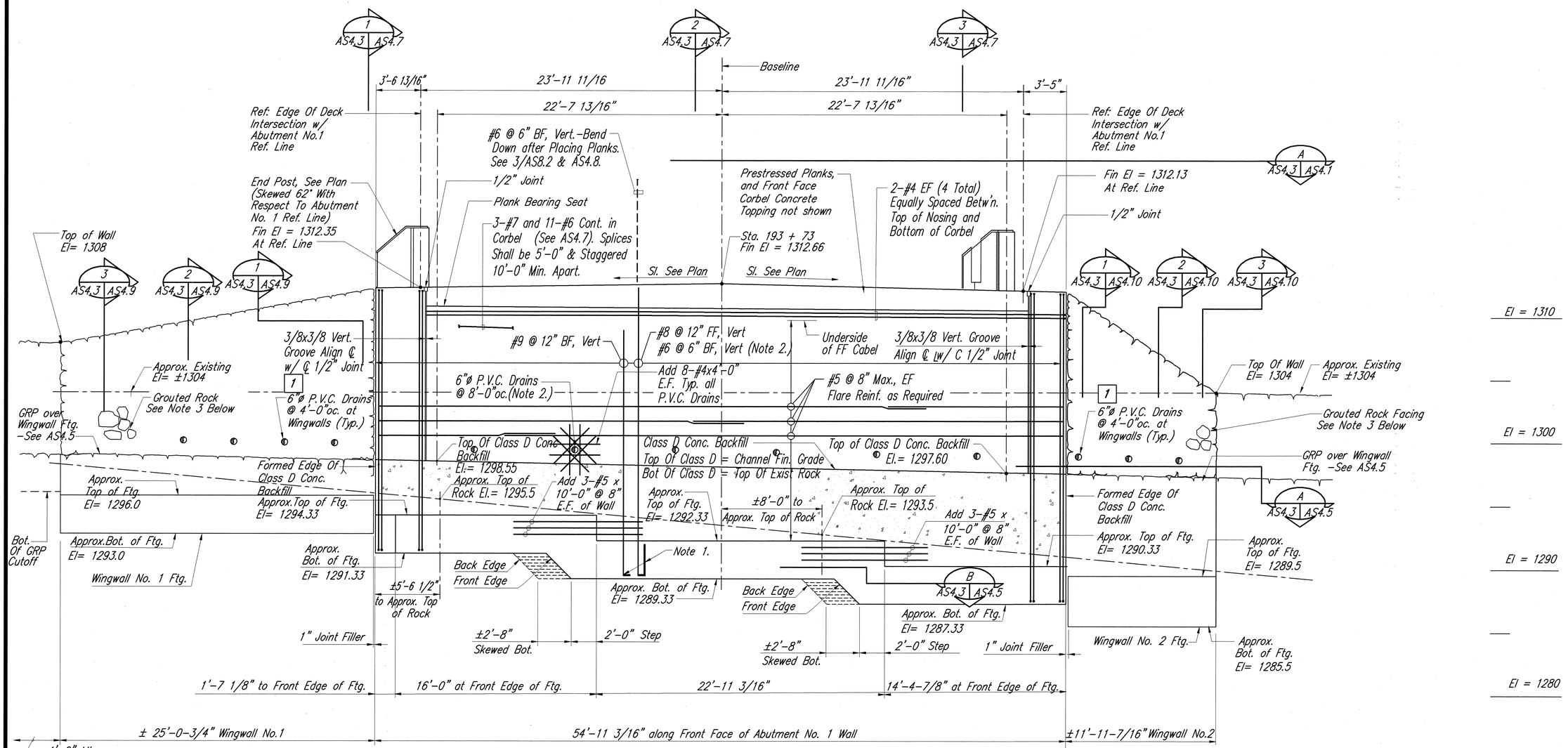
A AS4.2 AS4.4, AS4.8, AS4.11, AS4.12

4 3 2 1 0 4 8
1/4"= 1'-0"

SHEET No. AS4.2 OF 49 SHEETS

ADD. 46

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	47	145



ABUTMENT NO.1 and WINGWALL ELEVATIONS (HILO APPROACH)

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

A AS4.3 — AS4.1, AS4.3, AS4.5, AS4.7, AS4.9, AS4.10

Legend:

FF = Front Face Of Abutment Wall Or Footing – "Front" Faces The Channel

BF = Back Face Of Abutment Wall Or Footing – "Back" Faces The Abutment Backfill/Approach Slab.

Notes:

1. Vertical Bar Hooks And Footing Transverse Reinforcing Bars Are Aligned With The Roadway Baseline/Skewed 28° With Respect To Abutment Reference Line. Refer To A, B/AS4.7 For Vert. Bar Layout.
2. To Accommodate Placement Of 6"ø P.V.C. Drains @ 8'-0" oc., #6@6" oc. BF (Back Face), Vertical Reinforcing Foundation Dowels Shall Be Bundled/Respaced At Each Side Of Each Drain @ 8'-0" – To Allow Placement Of The P.V.C. Drain. The P.V.C. Drain Shall Be Sloped Vertically To Drain To The Channel. The P.V.C. Drain May Be Skewed (In The Horizontal Plane) To Clear Vertical Reinforcing.
3. Provide 9" Max. Thick Grouted Rock Facing Over Variable Slope Concrete Wingwalls. Anchor Rock facing To Concrete Wingwalls With Galvanized Steel Strap Ties With Powder Actuated Shot Pins At 16" Max. x 16" Max. Grid. See AS4.9 And AS4.10. Finished Facing Shall Match The Appearance Of Adjacent GRP. Grouted Rock Facing Shall Be Incidental To Concrete For Wingwalls.

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

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

STEWART N. WILLIAMS — LICENSED PROFESSIONAL ENGINEER No. 3908-S HAWAII, U.S.A.

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Mitsunaga & Associates, Inc.

DATE	DESCRIPTION
07-31-01	1 Corrected Drain Sizes

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO.1 and WINGWALL ELEVATIONS, DETAILS (HILO APPROACH)

MAMALAHOA HIGHWAY REPLACEMENT OF FORD CROSSING

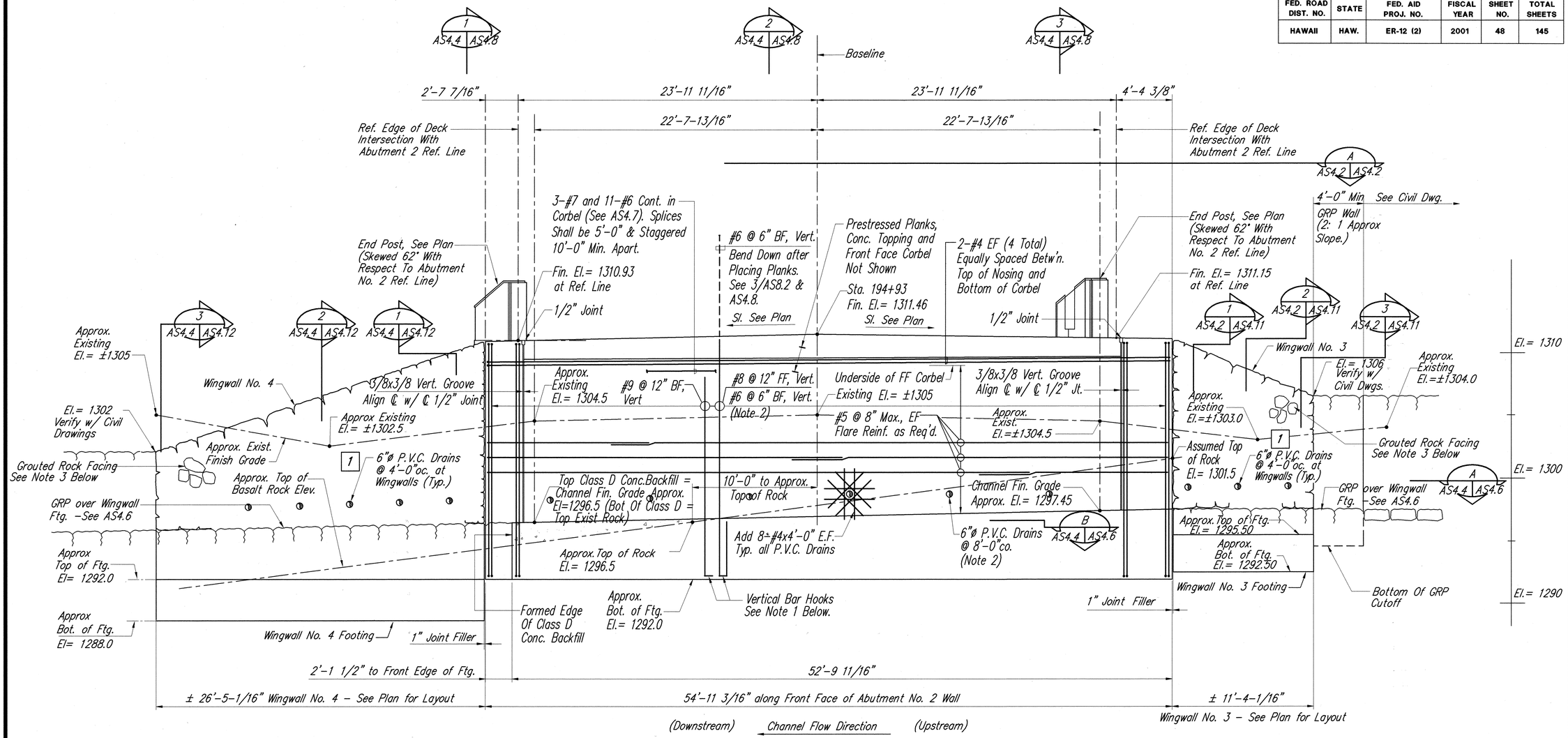
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

SHEET No. AS4.3 OF 49 SHEETS

ADD. 47

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	48	145



ABUTMENT NO.2 and WINGWALL ELEVATIONS (PAHALA APPROACH)

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

A AS4.2, AS4.4, AS4.6, AS4.8, AS4.11, AS4.12 | AS4.4

Legend:

FF = Front Face Of Abutment Wall Or Footing - "Front" Faces The Channel

BF = Back Face Of Abutment Wall Or Footing - "Back" Faces The Abutment Backfill/Approach Slab.

Notes:

1. Vertical Bar Hooks And Footing Transverse Reinforcing Bars Are Aligned With The Roadway Baseline/Skewed 28° With Respect To Abutment Reference Line. Refer To A, B/AS4.8 For Vert. Bar Layout.
2. To Accommodate Placement Of 6"ø P.V.C. Drains @ 8'-0" oc., #6@6" oc. BF (Back Face), Vertical Reinforcing Foundation Dowels Shall Be Bundled/Respaced At Each Side Of Each Drain @ 8'-0" - To Allow Placement Of The P.V.C. Drain. The P.V.C. Drain Shall Be Sloped Vertically To Drain To The Channel. The P.V.C. Drain May Be Skewed (In The Horizontal Plane) To Clear Vertical Reinforcing.
3. Provide 9" Max. Thick Grouted Rock Facing Over Variable Slope Concrete Wingwalls. Anchor Rock facing To Concrete Wingwalls With Galvanized Steel Strap Ties With Powder Actuated Shot Pins At 16" Max. x 16" Max. Grid. See AS4.11 And AS4.12. Finished Facing Shall Match The Appearance Of Adjacent GRP. Grouted Rock Facing Shall Be Incidental To Concrete For Wingwalls.

4 3 2 1 0 4 8
1/4"= 1'-0"

DATE	DESCRIPTION
07-31-01	1 Corrected Drain Sizes

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ABUTMENT NO.2 and WINGWALL ELEVATIONS, DETAILS (PAHALA APPROACH)

MAMALAHOA HIGHWAY REPLACEMENT OF FORD CROSSING

Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

STEWART N. WILLIAMS LICENSED PROFESSIONAL ENGINEER No. 3908-S HAWAII, U.S.A.

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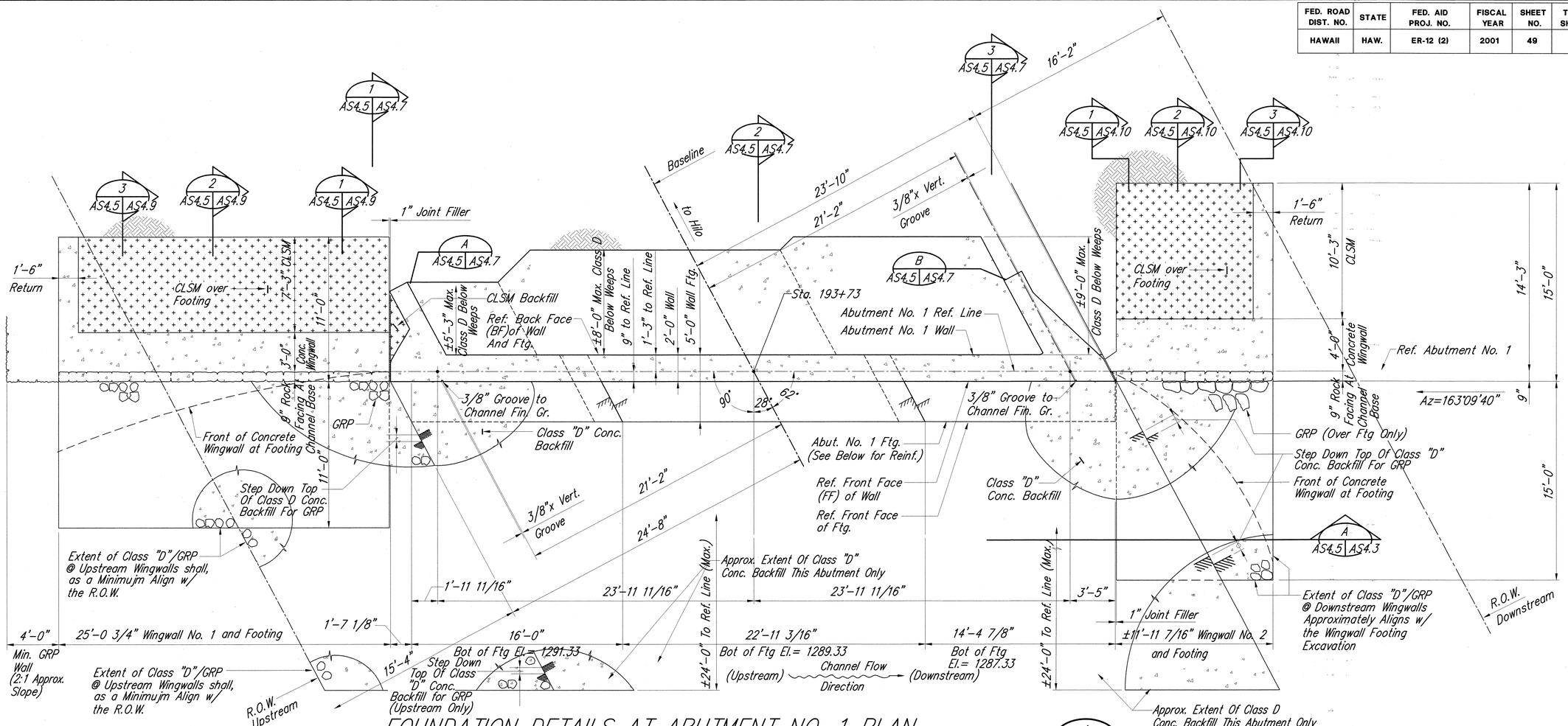
SHEET No. AS4.4 OF 49 SHEETS

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

ADD. 48

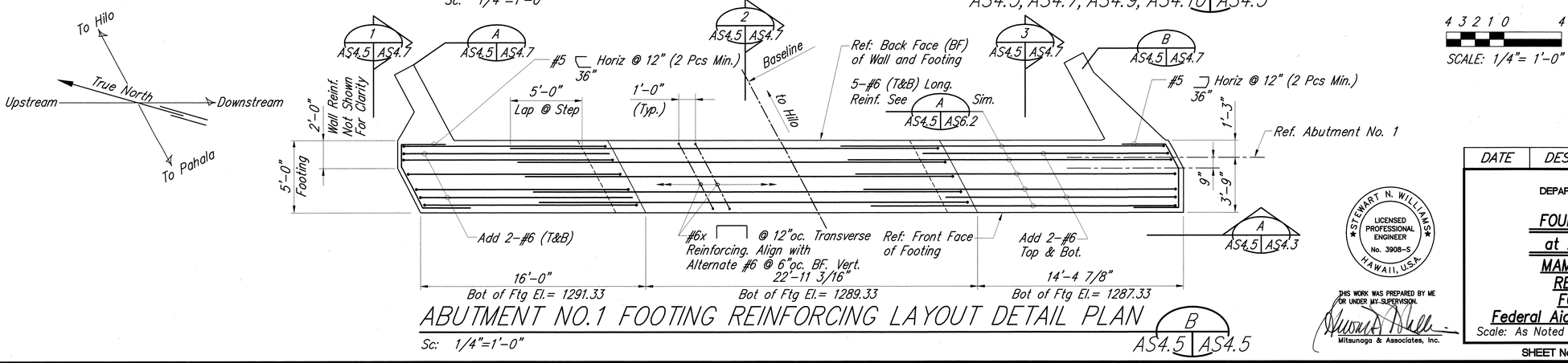
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	49	145



FOUNDATION DETAILS AT ABUTMENT NO. 1 PLAN

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

A AS4.3, AS4.7, AS4.9, AS4.10 AS4.5



ABUTMENT NO.1 FOOTING REINFORCING LAYOUT DETAIL PLAN

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

B AS4.5 AS4.5

4 3 2 1 0 4

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

DATE	DESCRIPTION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FOUNDATION DETAILS at ABUTMENT NO. 1
MAMALAHOA HIGHWAY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

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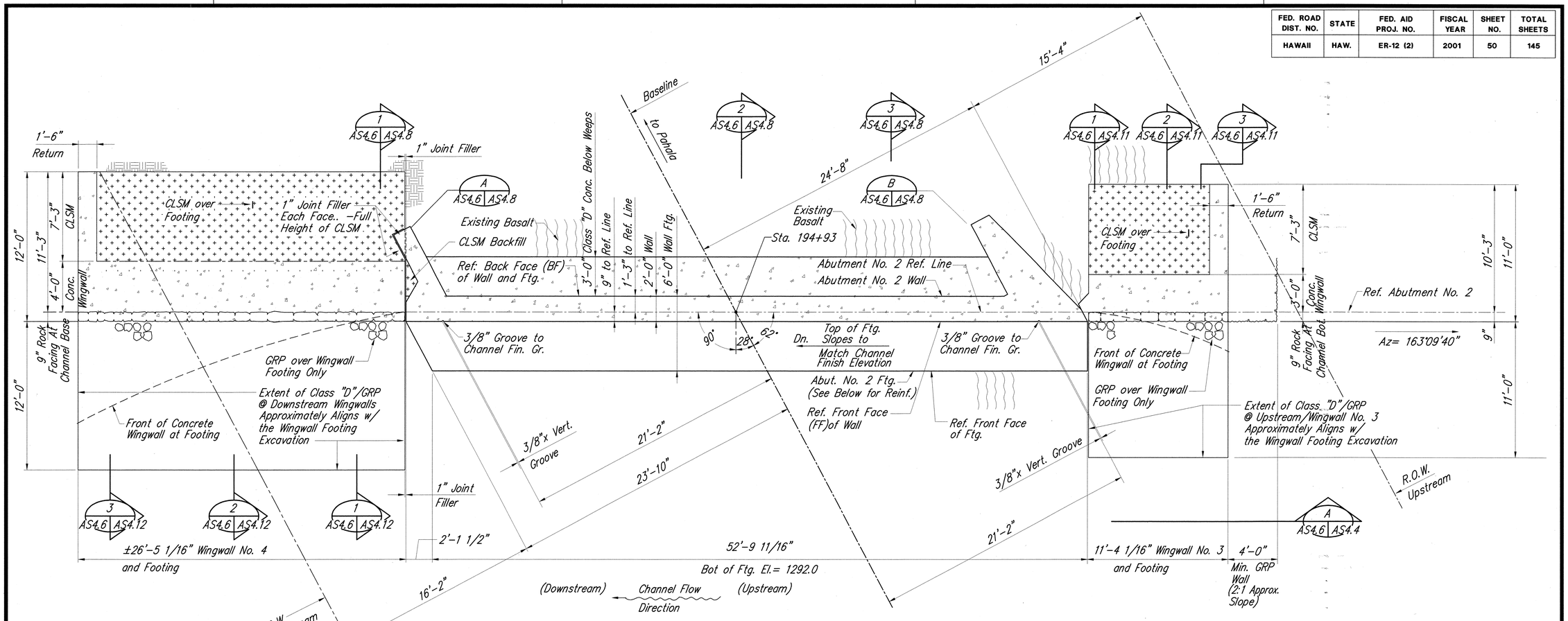
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | No.

SHEET No. AS4.5 OF 49 SHEETS

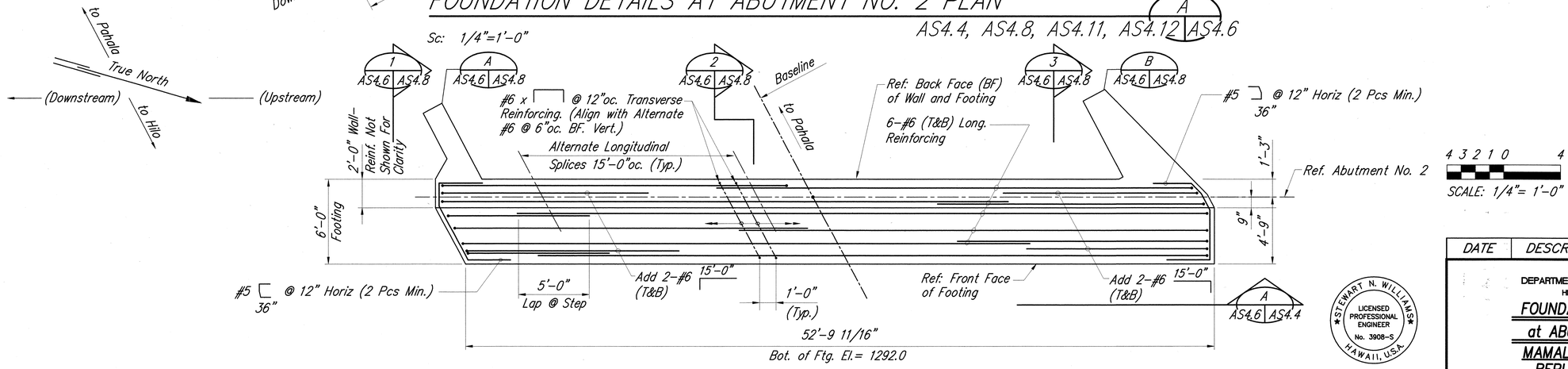
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	50	145



FOUNDATION DETAILS AT ABUTMENT NO. 2 PLAN

A AS4.4, AS4.8, AS4.11, AS4.12 | AS4.6

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



ABUTMENT NO.2 FOOTING REINFORCING LAYOUT DETAIL PLAN

B AS4.6 | AS4.6

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

DATE	DESCRIPTION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FOUNDATION DETAILS at ABUTMENT NO. 2 MAMALAHOA HIGHWAY REPLACEMENT OF FORD CROSSING

Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

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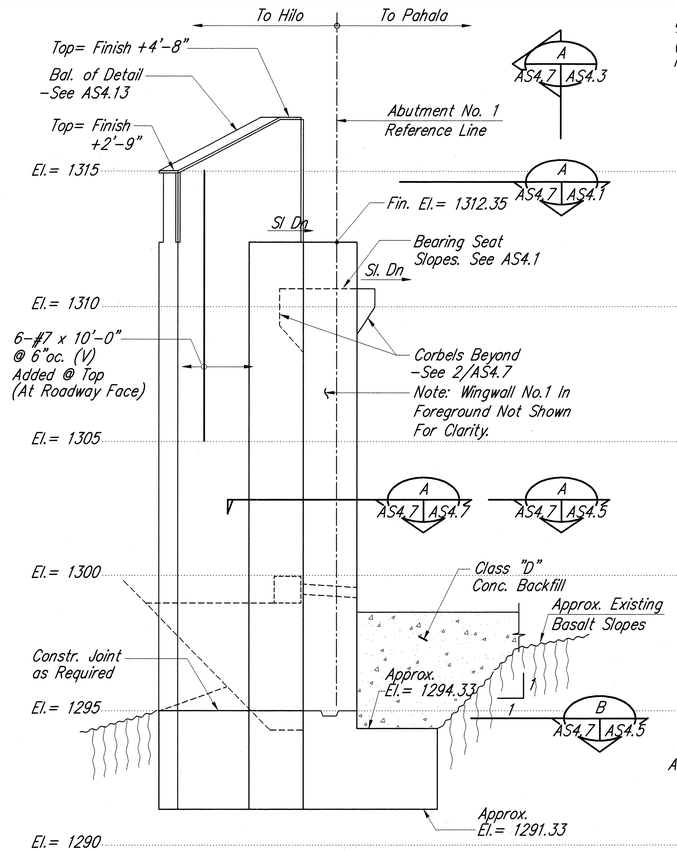
ORIGINAL PLAN — SURVEY PLOTTED BY — DRAWN BY — TRACED BY — DESIGNED BY — QUANTITIES BY — CHECKED BY — DATE — NOTE BOOK — No.

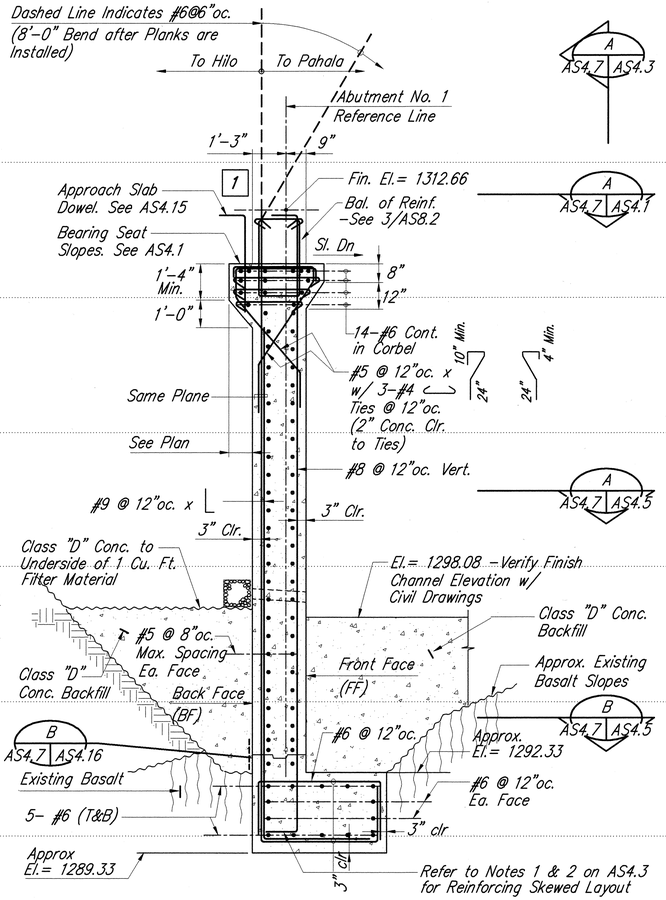
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	51	145



Legend: Sl Dn = Slope Down To Follow Roadway Baseline.

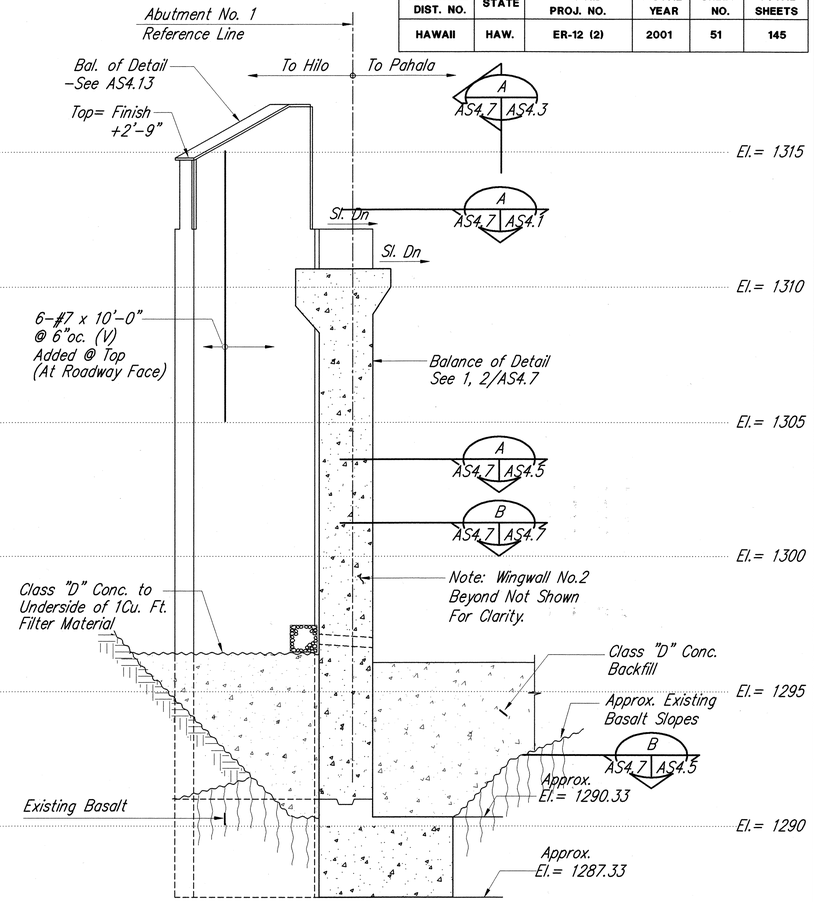
ELEVATION at UPSTREAM COLUMN 1

Scale: 3/8"= 1'-0" AS4.1, AS4.3, AS4.5, AS4.7 | AS4.7



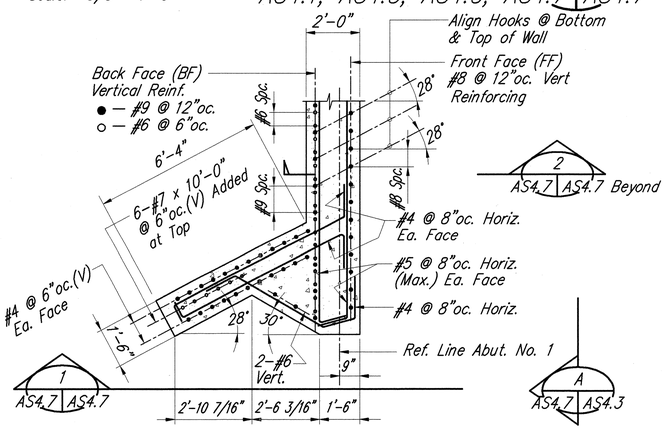
ABUTMENT NO. 1 WALL at BASELINE 2

Scale: 3/8"= 1'-0" AS4.1, AS4.3, AS4.5, AS4.7 | AS4.7



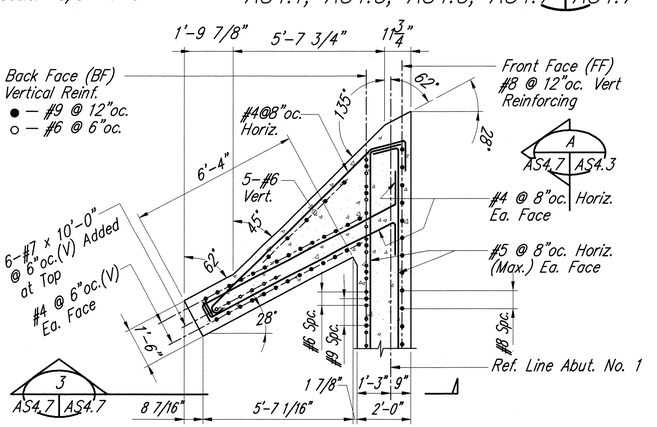
ELEVATION at DOWNSTREAM COLUMN 3

Scale: 3/8"= 1'-0" AS4.1, AS4.3, AS4.5, AS4.7 | AS4.7



PLAN at UPSTREAM END A

Scale: 3/8"= 1'-0" AS4.5, AS4.7 | AS4.7



PLAN at DOWNSTREAM END B

Scale: 3/8"= 1'-0" AS4.5, AS4.7 | AS4.7

DATE	DESCRIPTION
07-31-01	1 Clarified #6@6"o.c. Bend Geometry

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

COLUMN DETAILS AT ABUTMENT NO. 1
MAMALAHOA HIGHWAY
REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

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LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

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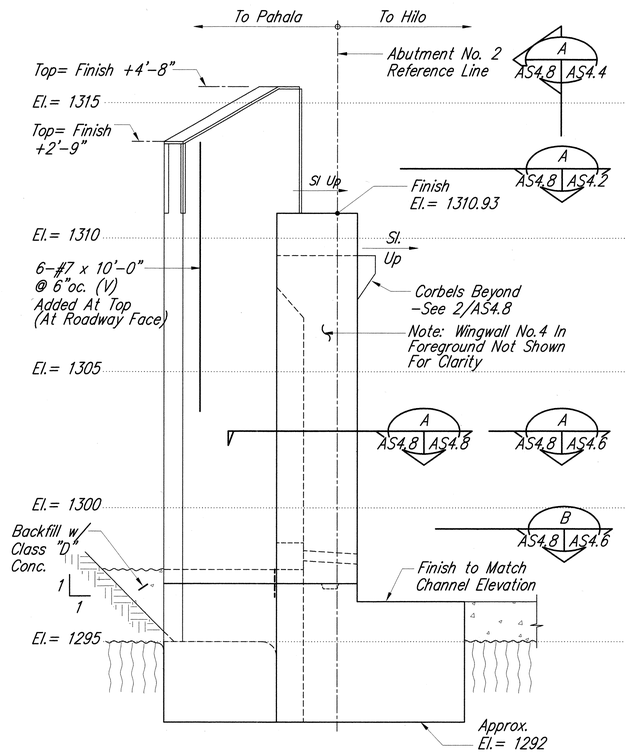
2 0 2 4FT
SCALE: 3/8"= 1'-0"

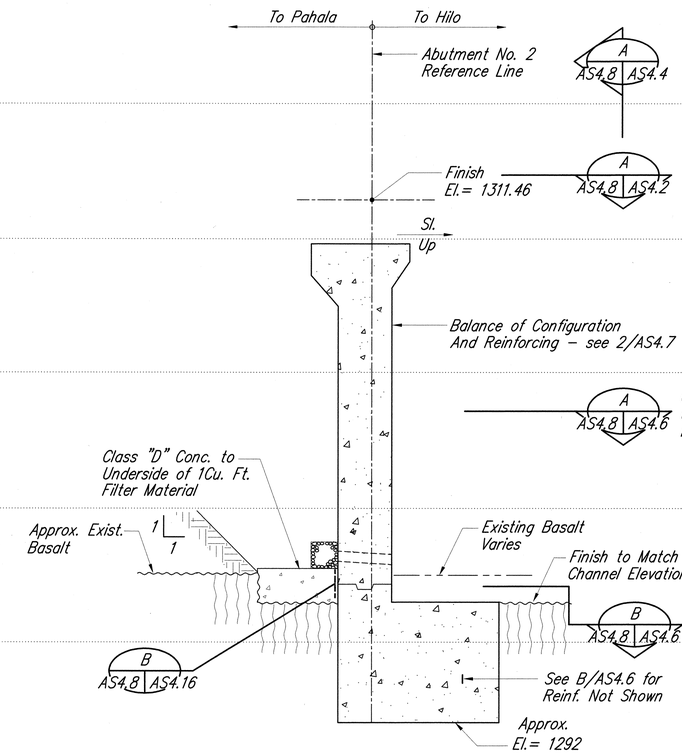
ORIGINAL PLANS PREPARED BY	SURVEY PLOTTED BY	DATE
NOTE BOOK	TRACED BY	
No.	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

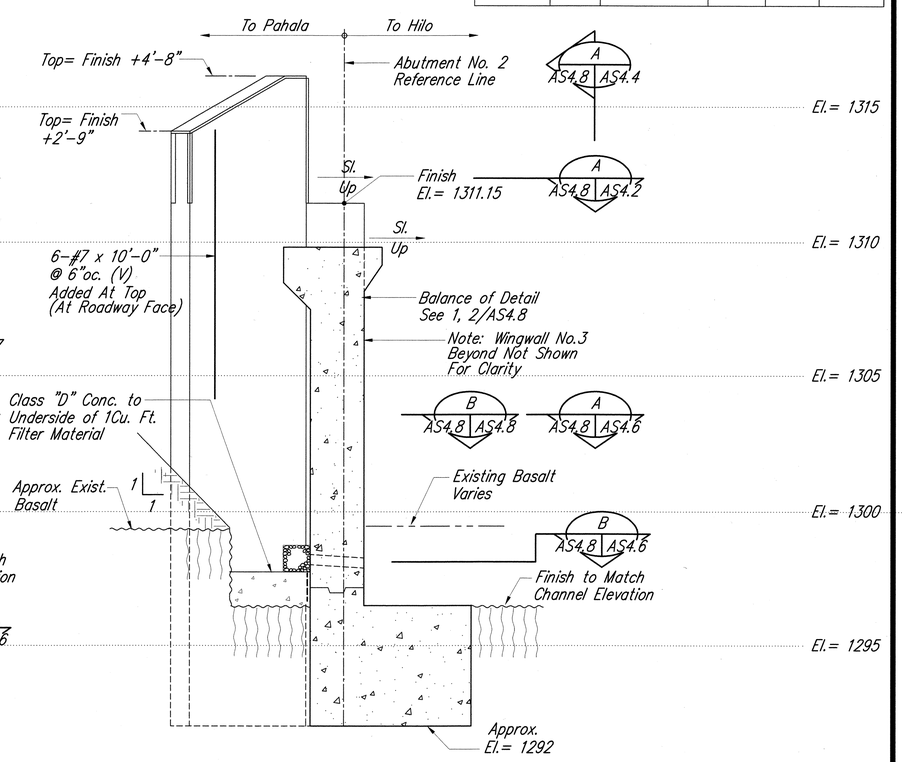
SHEET No. AS4.7 OF 49 SHEETS

ADD. 51

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	52	145







Legend: SI Up = Slope Up To Follow Roadway Baseline.

ELEVATION at DOWNSTREAM COLUMN (1)

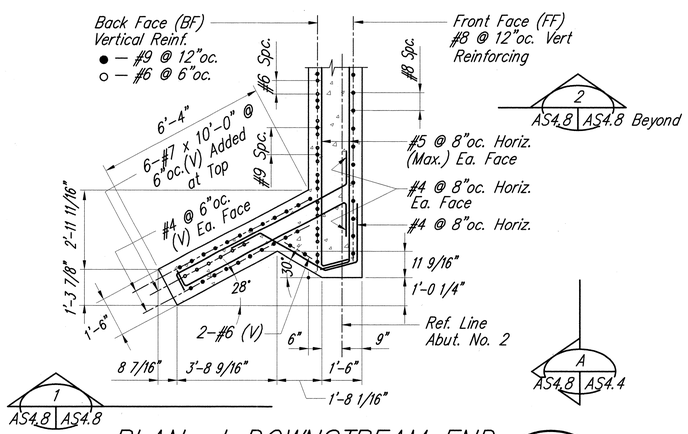
Scale: 3/8"= 1'-0" AS4.2, AS4.4, AS4.6, AS4.8 | AS4.8

ABUTMENT NO. 2 WALL at BASELINE (2)

Scale: 3/8"= 1'-0" AS4.2, AS4.4, AS4.6, AS4.8 | AS4.8

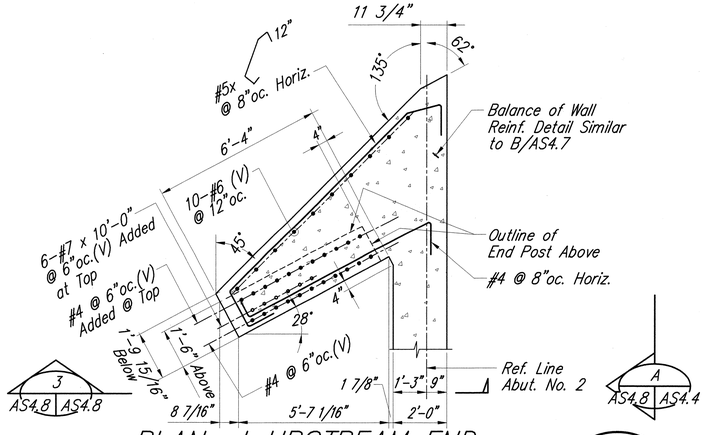
ELEVATION at UPSTREAM COLUMN (3)

Scale: 3/8"= 1'-0" AS4.2, AS4.4, AS4.6, AS4.8 | AS4.8



PLAN at DOWNSTREAM END (A)

Scale: 3/8"= 1'-0" AS4.6, AS4.8 | AS4.8



PLAN at UPSTREAM END (B)

Scale: 3/8"= 1'-0" AS4.6, AS4.8 | AS4.8

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

DATE	DESCRIPTION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

COLUMN DETAILS AT ABUTMENT NO. 2 MAMALAHOA HIGHWAY REPLACEMENT OF FORD CROSSING

Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

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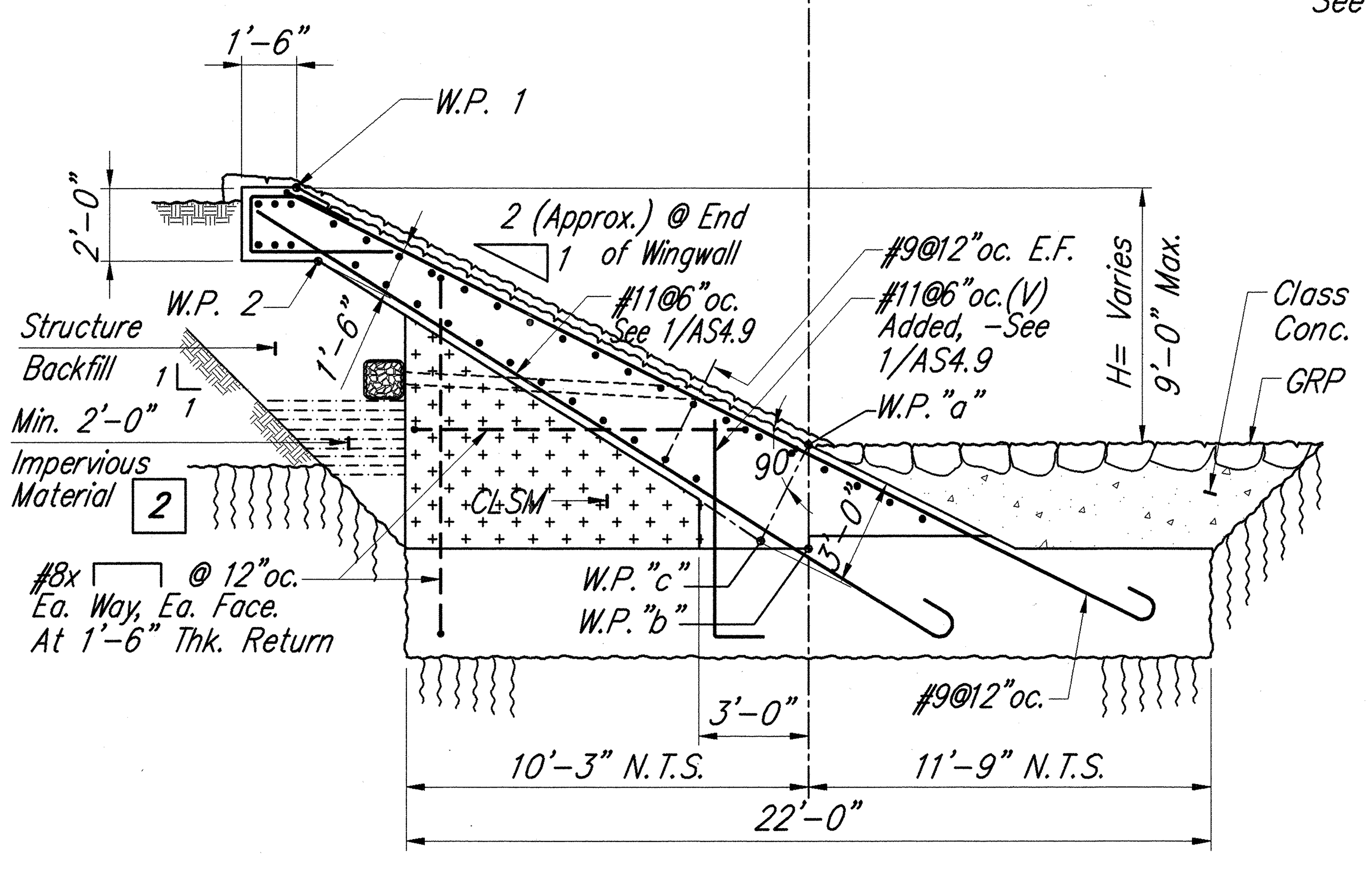
2 0 2 4FT

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

SHEET No. AS4.8 OF 49 SHEETS

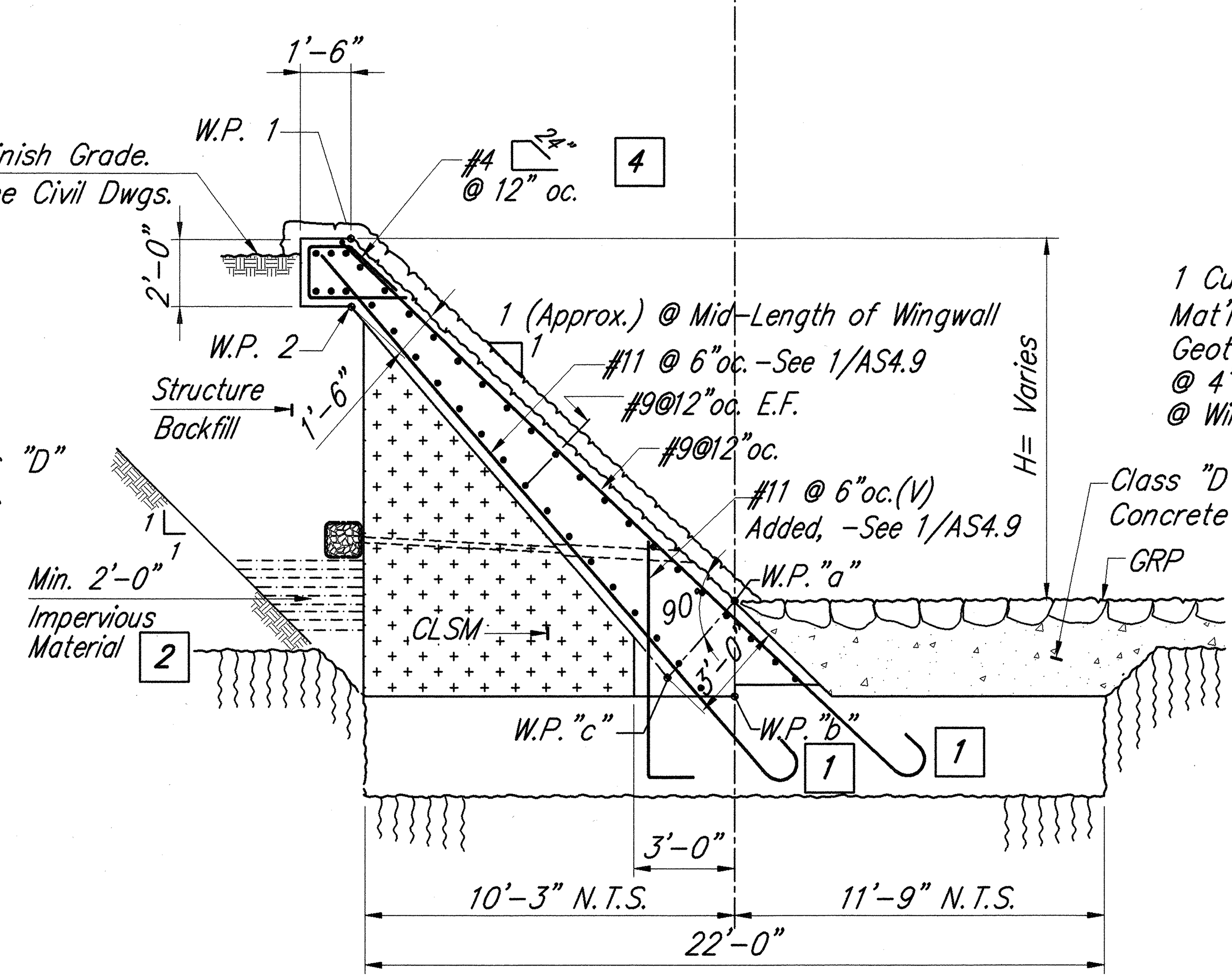
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	53	145

Legend:
1. N.T.S. = "Not To Scale"
2. W.P."a" = Intersection Of Face Of Concrete Wall and Channel Bottom And Abutment Reference Line.
3. W.P."b" = Intersection Of Face Of Concrete Wall and Top of Footing And Abutment Reference Line.
4. W.P."c" = Start Point For Concrete Wall Taper.
5. W.P."1" = Top Of Concrete Wall/Channel Face.
6. W.P."2" = End Point For Concrete Wall Taper.



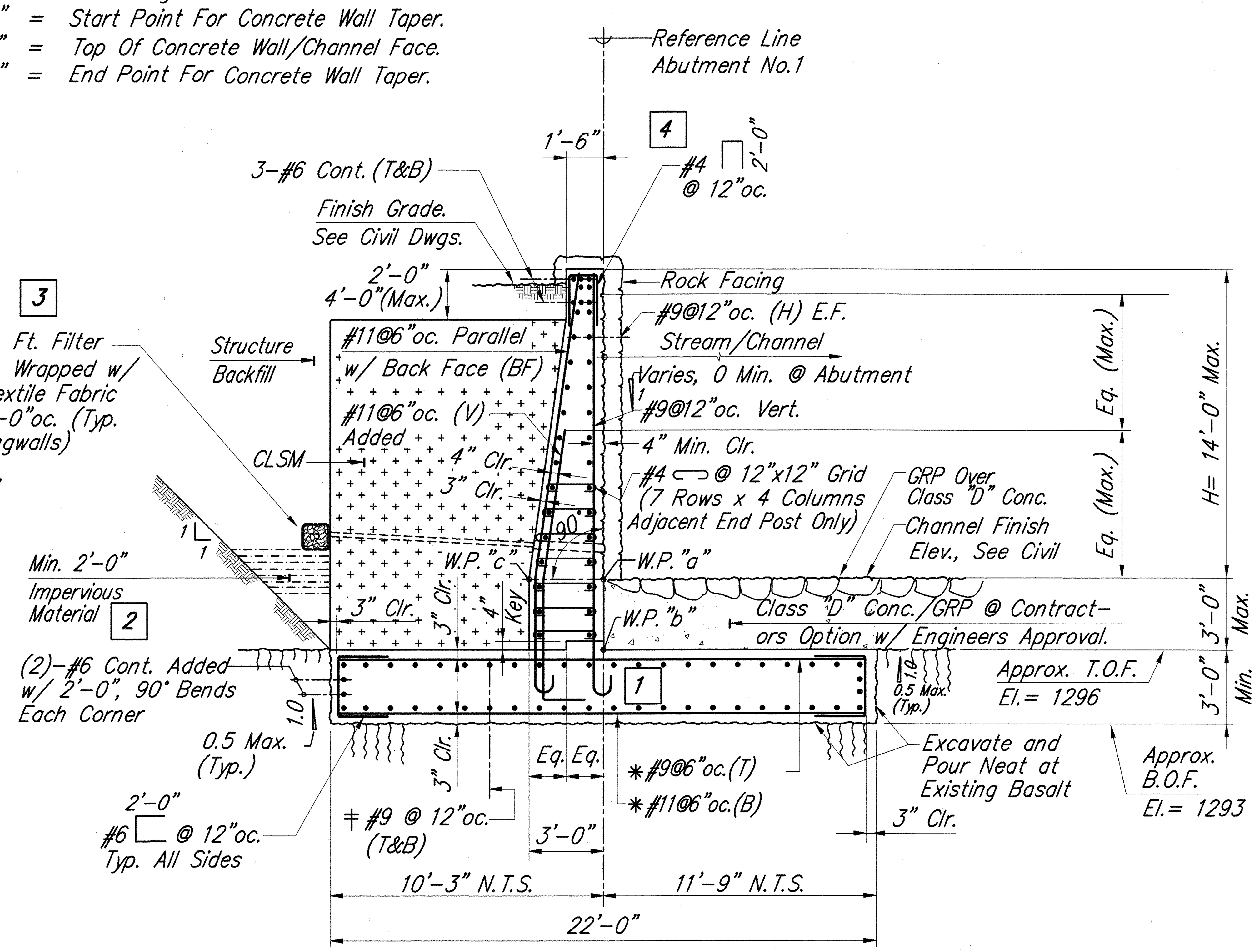
Note:
For Balance of Detail, See 1/AS4.9 and 4/AS4.9 5

WINGWALL No. 1 ~ SECTION at UPSTREAM END
SCALE: 1/4" = 1'-0" 3 AS4.9 | AS4.9



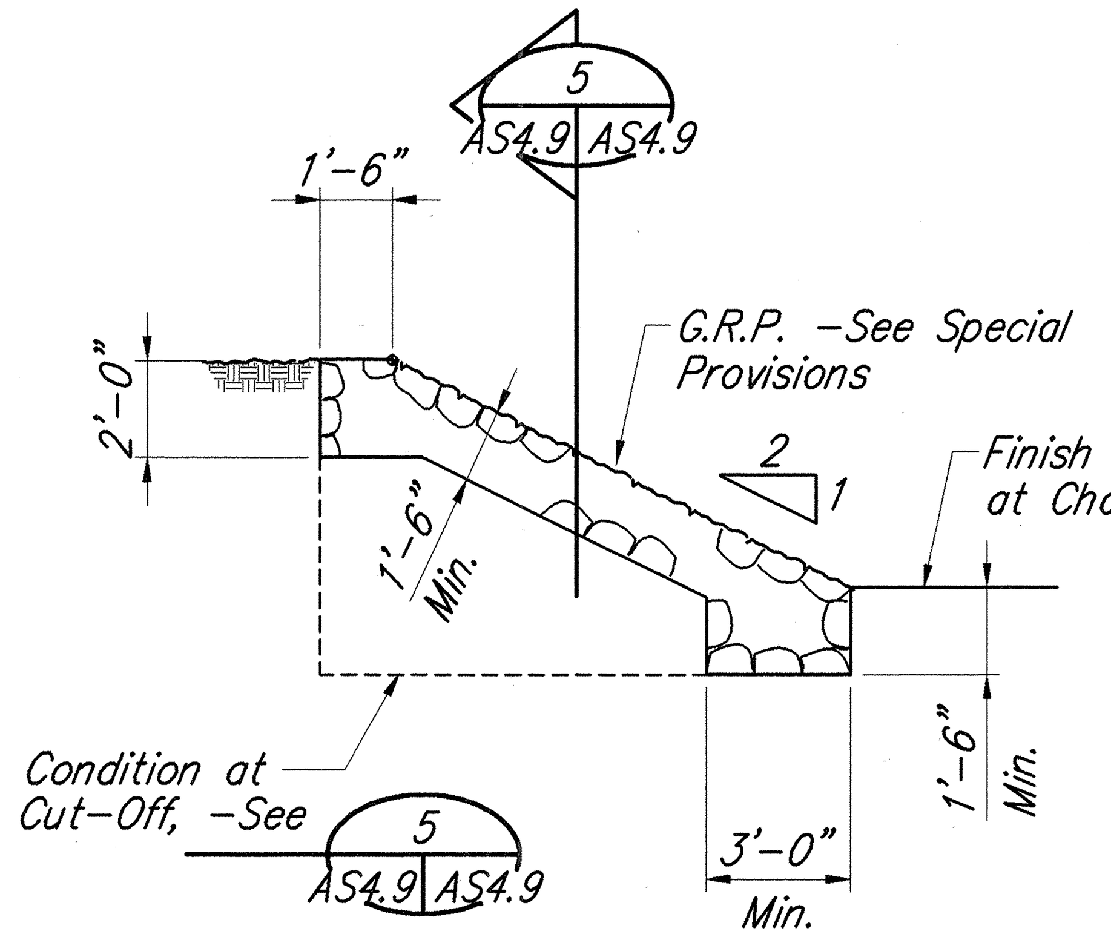
Note:
For Balance of Detail, See 1/AS4.9

WINGWALL No. 1 ~ SECTION at MID-LENGTH
SCALE: 1/4" = 1'-0" 2 AS4.9 | AS4.9



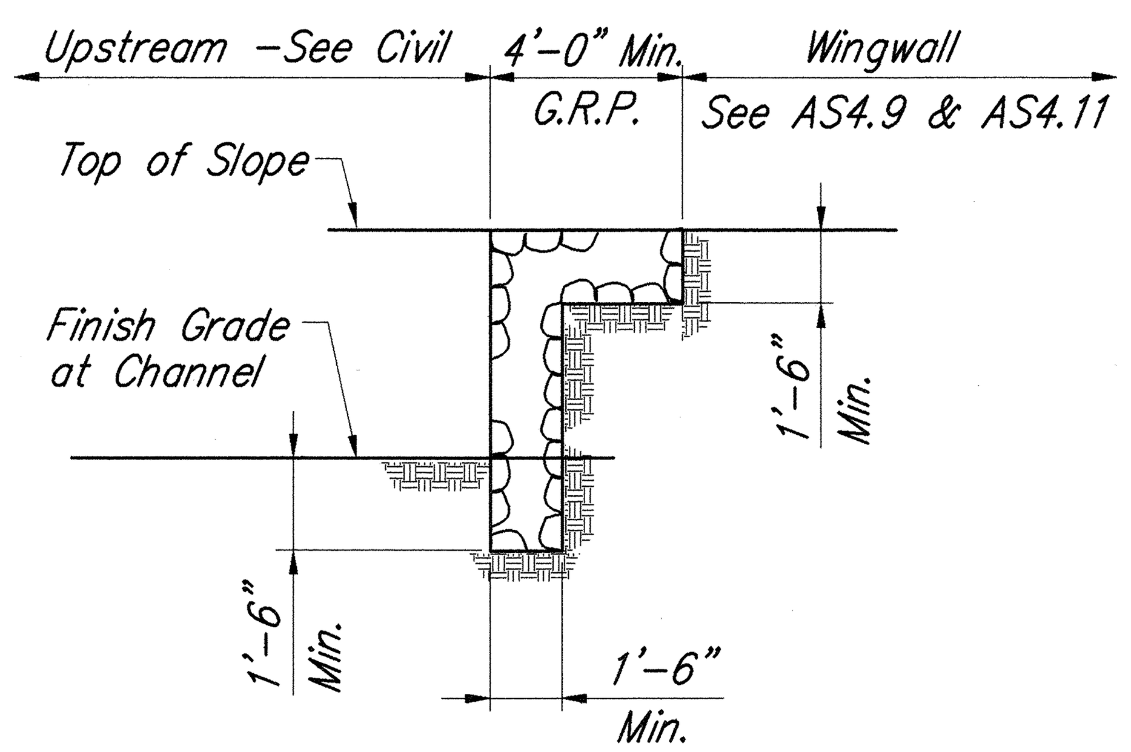
Notes: ✱ = Parallel with Baseline
‡ = Parallel with Abutment Reference Line

WINGWALL No. 1 ~ SECTION at ABUTMENT
SCALE: 1/4" = 1'-0" 1 AS4.9 | AS4.9



5

G.R.P. DETAIL
N.T.S. 4 AS4.9 | AS4.9



5

G.R.P. DETAIL
N.T.S. 5 AS4.9 | AS4.9

DATE		DESCRIPTION
07-31-01	5	Added G.R.P. Detail
07-31-01	4	Clarified Wall Top Reinforcing
07-31-01	3	Clarified Drain Locations
07-31-01	2	Added Min. 2'-0" Impervious Material
07-31-01	1	Clarified 180° Hooks Orientation

4 3 2 1 0 4 8
SCALE: 1/4"= 1'-0"

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WINGWALL SECTIONS and DETAILS

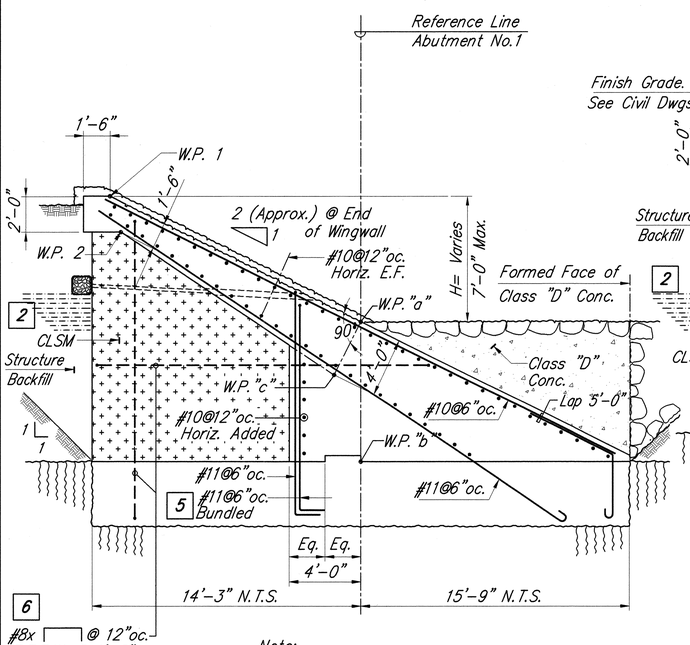
MAMALAHOA HIGHWAY
REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

SHEET No. AS4.9 OF 49 SHEETS

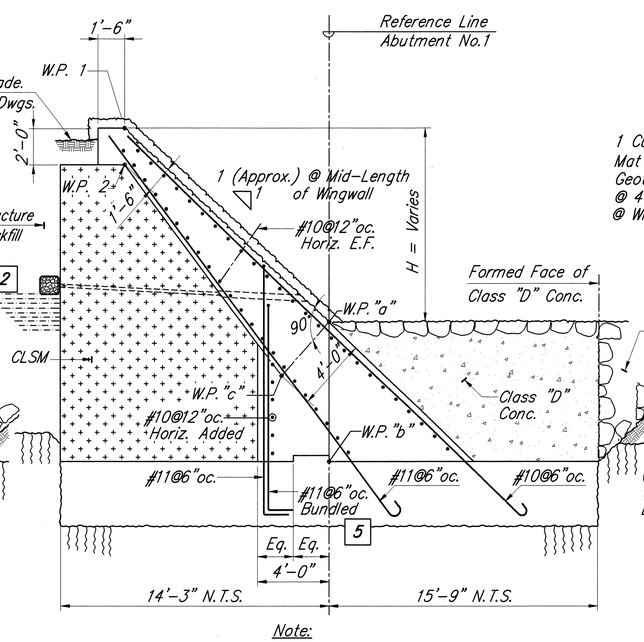
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	54	145



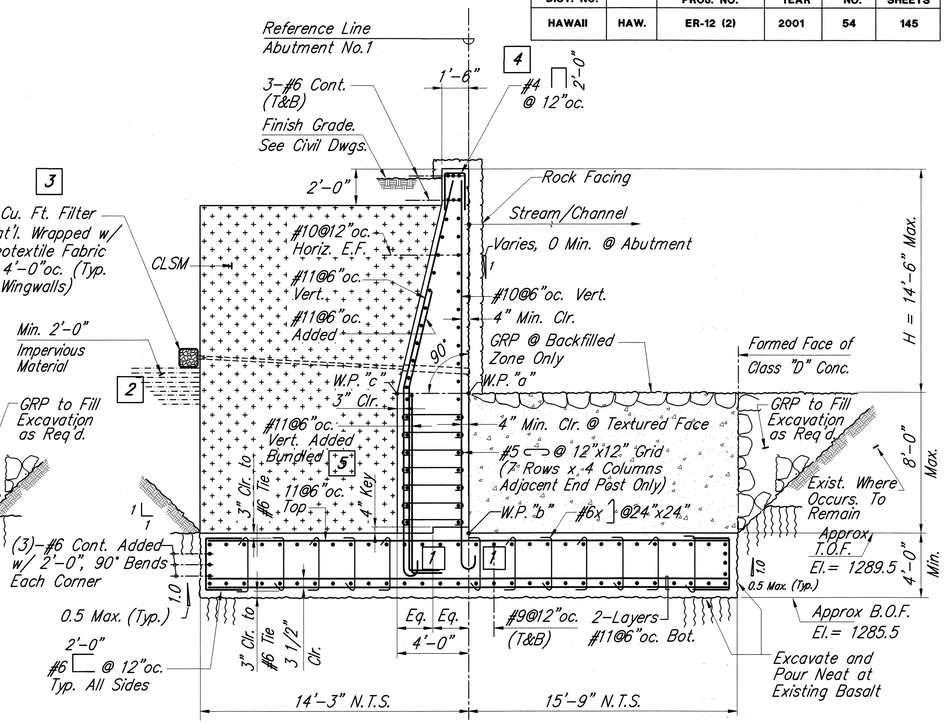
WINGWALL No. 2 ~ SECTION at UPSTREAM END 3 AS4.10 AS4.10

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



WINGWALL No. 2 ~ SECTION at MID-LENGTH 2 AS4.10 AS4.10

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



WINGWALL No. 2 ~ SECTION at ABUTMENT 1 AS4.10 AS4.10

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

DATE	DESCRIPTION
07-31-01	6 Clarified Reinf. @ 1'-6" Return
07-31-01	5 Clarified Bundled Reinforcing
07-31-01	4 Clarified Wall Top Reinforcing
07-31-01	3 Clarified Drain Locations
07-31-01	2 Added Min. 2'-0" Impervious Material
07-31-01	1 Clarified 180° Hooks Orientation

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WINGWALL SECTIONS and DETAILS

MAMALAHOA HIGHWAY
REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

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LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

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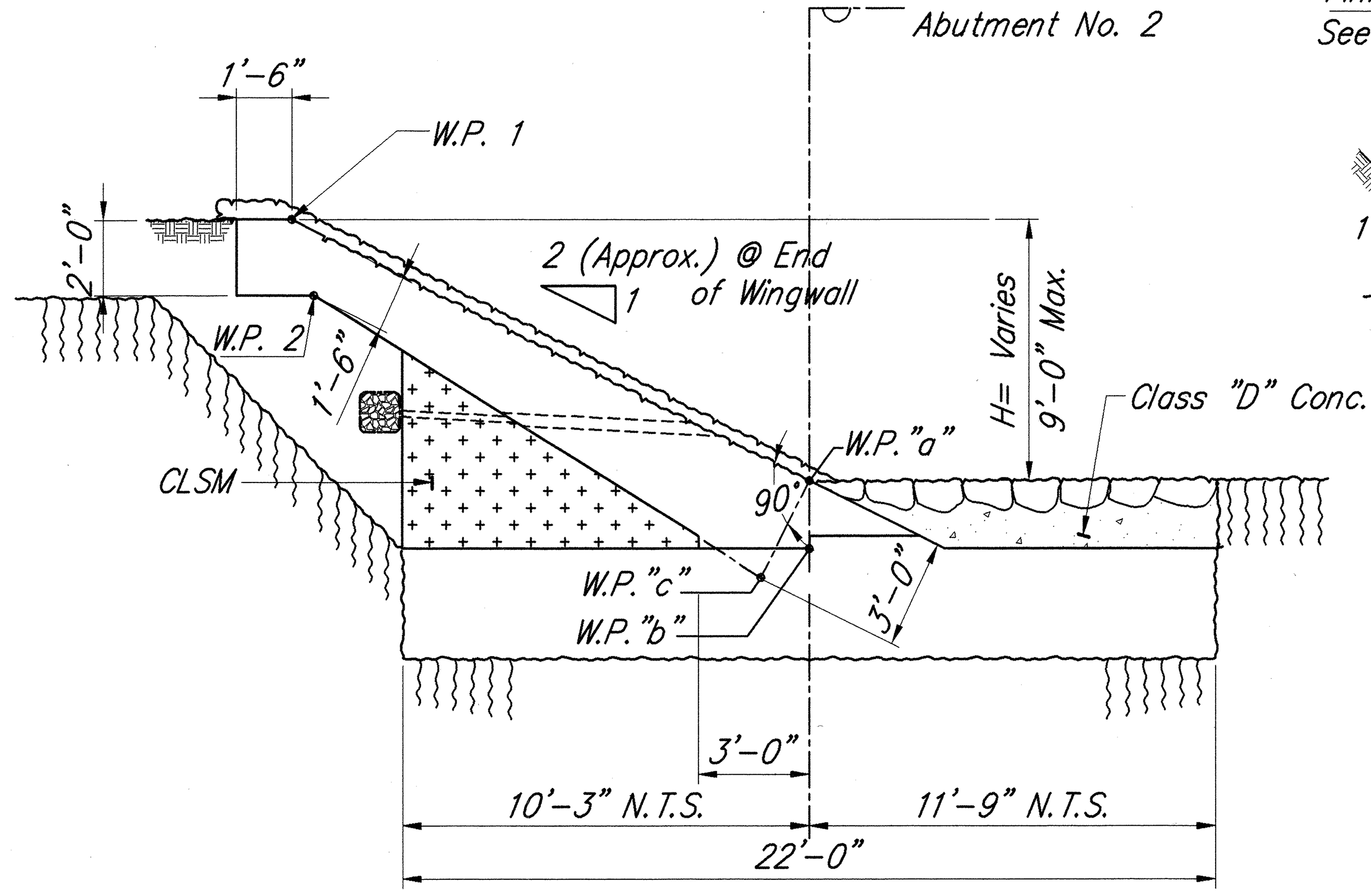
Mitsunaga & Associates, Inc.

4 3 2 1 0 4 8
SCALE: 1/4"= 1'-0"

SHEET No. AS4.10 OF 49 SHEETS

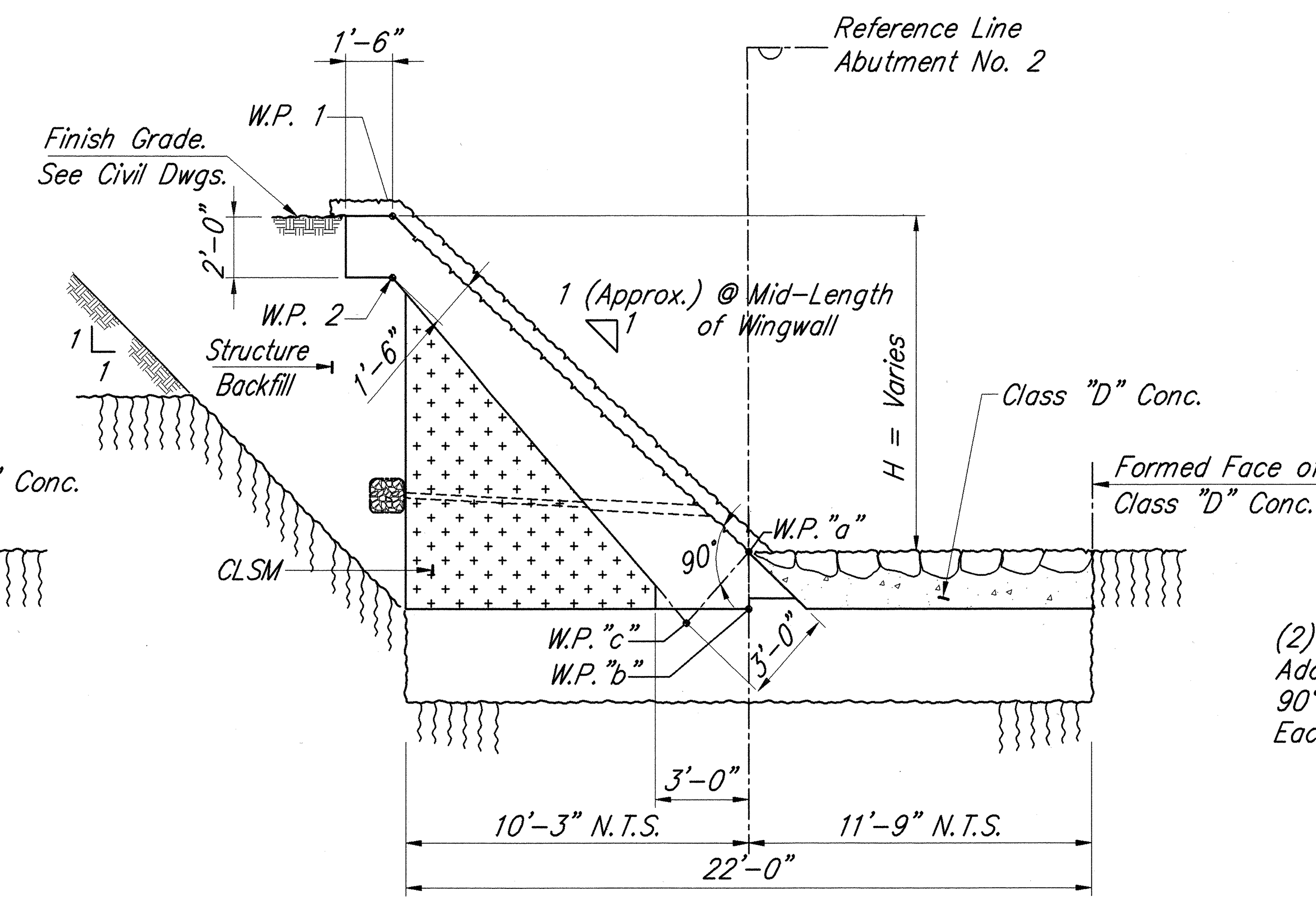
ADD. 54

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	55	145



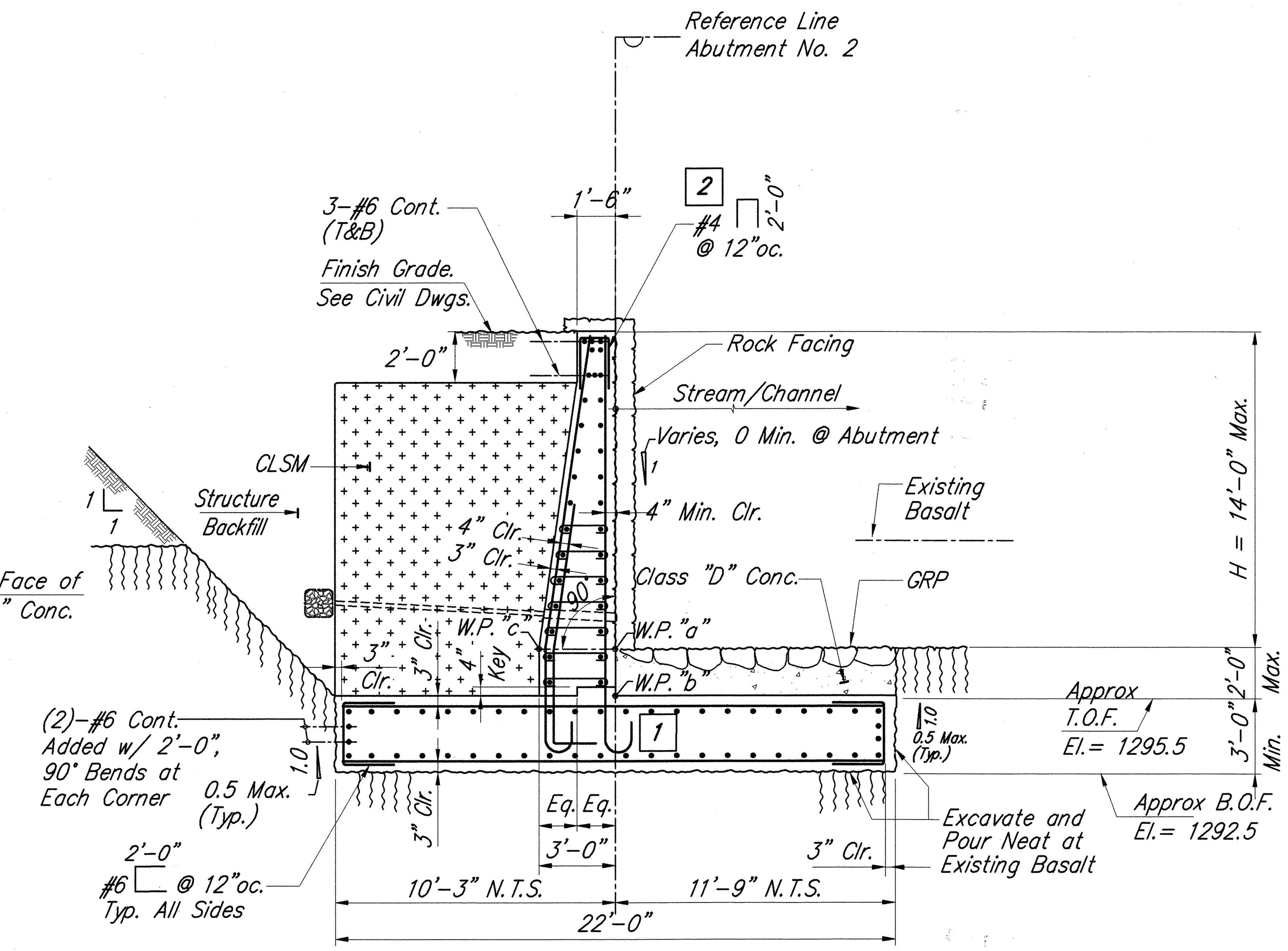
Note:
For Balance of Detail, See 3 AS4.11 AS4.9

WINGWALL No. 3 ~ SECTION at UPSTREAM END 3 AS4.11 AS4.11 SCALE: 1/4" = 1'-0"



Note:
For Balance of Detail, See 2 AS4.11 AS4.9

WINGWALL No. 3 ~ SECTION at MID-LENGTH 2 AS4.11 AS4.11 SCALE: 1/4" = 1'-0"



Note:
For Balance of Detail, See 1 AS4.11 AS4.9

WINGWALL No. 3 ~ SECTION at ABUTMENT 1 AS4.11 AS4.11 SCALE: 1/4" = 1'-0"

DATE	DESCRIPTION
07-31-01	2 Clarified Wall Top Reinforcing
07-31-01	1 Clarified 180° Hook Orientation

4 3 2 1 0 4 8
SCALE: 1/4"= 1'-0"

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WINGWALL SECTIONS and DETAILS

MAMALAHOA HIGHWAY
REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

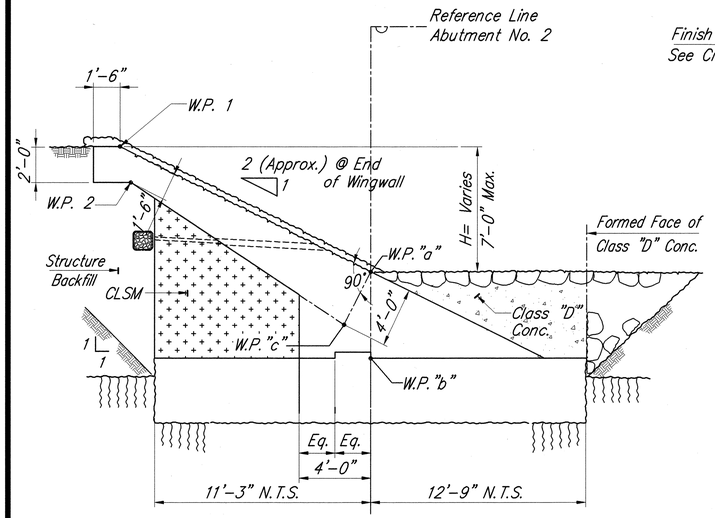
Scale: As Noted Feb. 2001

SHEET No. AS4.11 OF 49 SHEETS

ADD. 55

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.	ER-12 (2)	2001	56	145

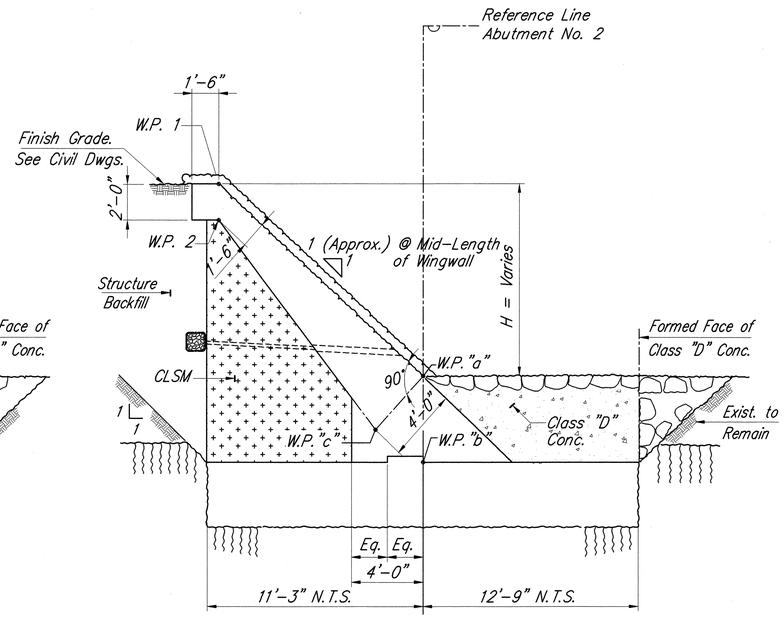


Note:
For Balance of Detail, See 3 AS4.12 | AS4.10

WINGWALL No. 4 ~ SECTION at UPSTREAM END

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

3 AS4.12 | AS4.12

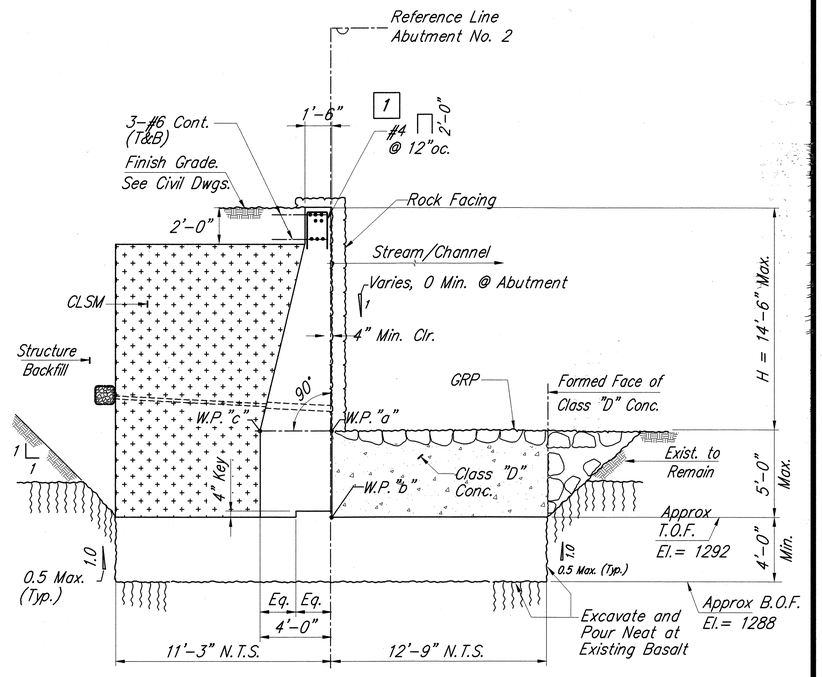


Note:
For Balance of Detail, See 2 AS4.12 | AS4.10

WINGWALL No. 4 ~ SECTION at MID-LENGTH

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

2 AS4.12 | AS4.12



Note:
For Balance of Detail, See 1 AS4.12 | AS4.10

WINGWALL No. 4 ~ SECTION at ABUTMENT

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

1 AS4.12 | AS4.12

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

4 3 2 1 0 4 8

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

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LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

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Mitsunaga & Associates, Inc.

DATE	DESCRIPTION
07-31-01	1 Clarified Wall Top Reinforcing

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WINGWALL SECTIONS and DETAILS

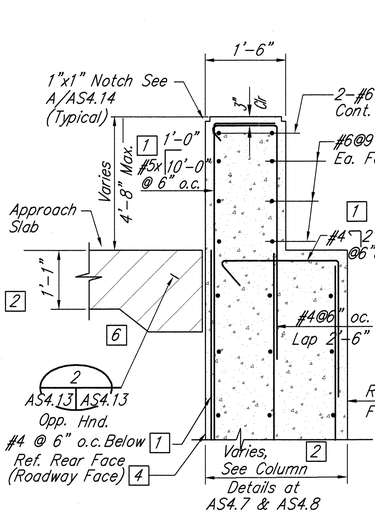
MAMALAHOA HIGHWAY
REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

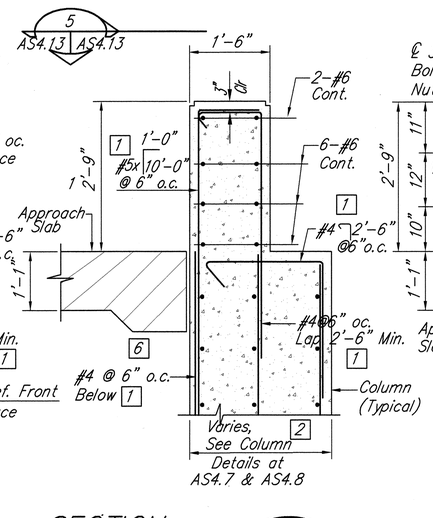
SHEET No. AS4.12 OF 49 SHEETS

ADD. 56

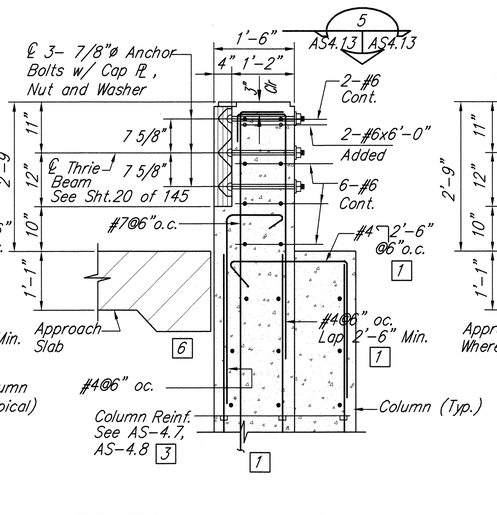
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	57	145



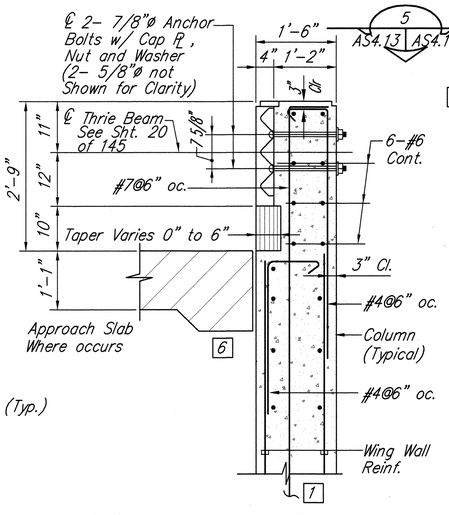
SECTION 1
Sc: 3/4"= 1'-0" AS4.13 AS4.13



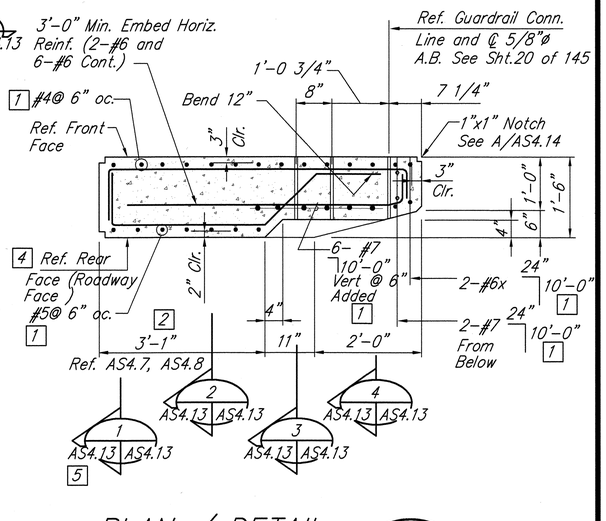
SECTION 2
Sc: 3/4"= 1'-0" AS4.13 AS4.13



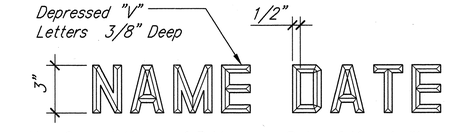
SECTION 3
Sc: 3/4"= 1'-0" AS4.13 AS4.13



SECTION 4
Sc: 3/4"= 1'-0" AS4.13 AS4.13



PLAN / DETAIL 5
Sc: 3/4"= 1'-0" AS4.13 AS4.13



Use Correct Name of Bridge (See Note 3 Below)

Date of Year built (See Note 3 Below)

NOTES:

1. Unless otherwise Directed by The Engineer, The Bridge Name and Date built shall be placed at the "Trailing" End Post on each side of the roadway.
2. Exact details and spacing of letter and figures and location shall be as directed by the Engineer. Gothic letters and figures approximating dimensions shown will be acceptable if approved by the Engineer.
3. Unless Otherwise Directed By The Engineer. The Bridge Name Shall Be MAKAKUPU BRIDGE. The Date Shall Be 2001.

TYPICAL DETAIL OF LETTERS AND FIGURES AT CONCRETE END POST

BRIDGE IDENTIFICATION DETAIL A
Not to Scale AS4.13 AS4.13

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

1 0 1 2FT
SC: 3/4"= 1'-0"

STEWART N. WILLIAMS LICENSED PROFESSIONAL ENGINEER No. 3908-S HAWAII, U.S.A.

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Mitsunaga & Associates, Inc.

DATE	DESCRIPTION
07-31-01	6 Clarified Approach Slab Edge
07-31-01	5 Clarified Reference Detail
07-31-01	4 Clarified Roadway Face
07-31-01	3 Corrected Reference Note
07-31-01	2 Clarified End Post Size
07-31-01	1 Clarified Reinforcing

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

END POST DETAILS

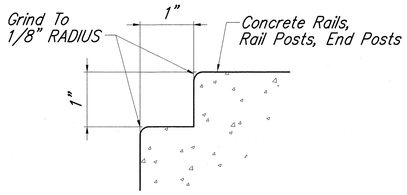
MAMALAHOA HIGHWAY
REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

SHEET No. AS4.13 OF 49 SHEETS

ADD. 57

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	58	145



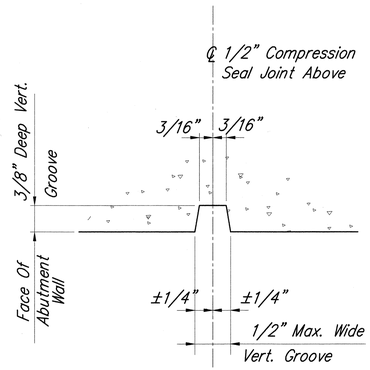
Notch Notes:

1. 1"x1" Corner Notches Shall Be Provided At All Corners Of Concrete Bridge Rails, Bridge Rail Posts And Including Top And Vertical Faces Of Concrete End Posts (Except At Vertical Face Of End Post Where Metal Thrie Beam Connection Occurs).
2. All Outer Corners Of Notches Shall Be eased By Grinding to A Uniform, Continuous 1/8" Radius
3. Color And Texture Of Concrete Shall Match Adjacent Surface Color And Texture.

1"x1" NOTCH DETAIL AT RAILS, RAIL POSTS AND END POSTS

A | AS4.14 | AS4.14

Sc: 3/4" Full Size

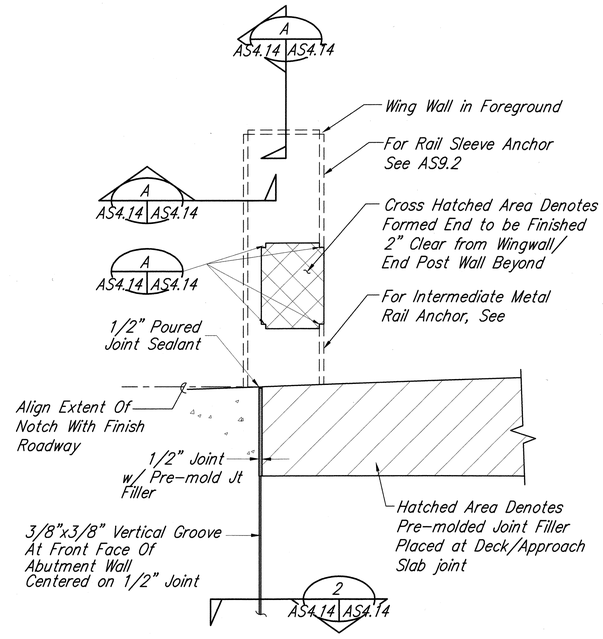


Note:
Vertical Groove Shall Not Be Greater Than 3/8", so That Concete Cover = 2 5/8" Min. At Abutment Wall Reinforcing.

3/8" x 3/8" VERTICAL GROOVE

2 | AS4.14 | AS4.14

Sc: Full Size



TYPICAL JOINT DETAIL AT RAILS

1 | AS4.14 | AS4.14

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

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

1 0 1 2FT
SCALE: 3/4"= 1'-0"

STEWART N. WILLIAMS
LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

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Mitsunaga & Associates, Inc.

DATE	DESCRIPTION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

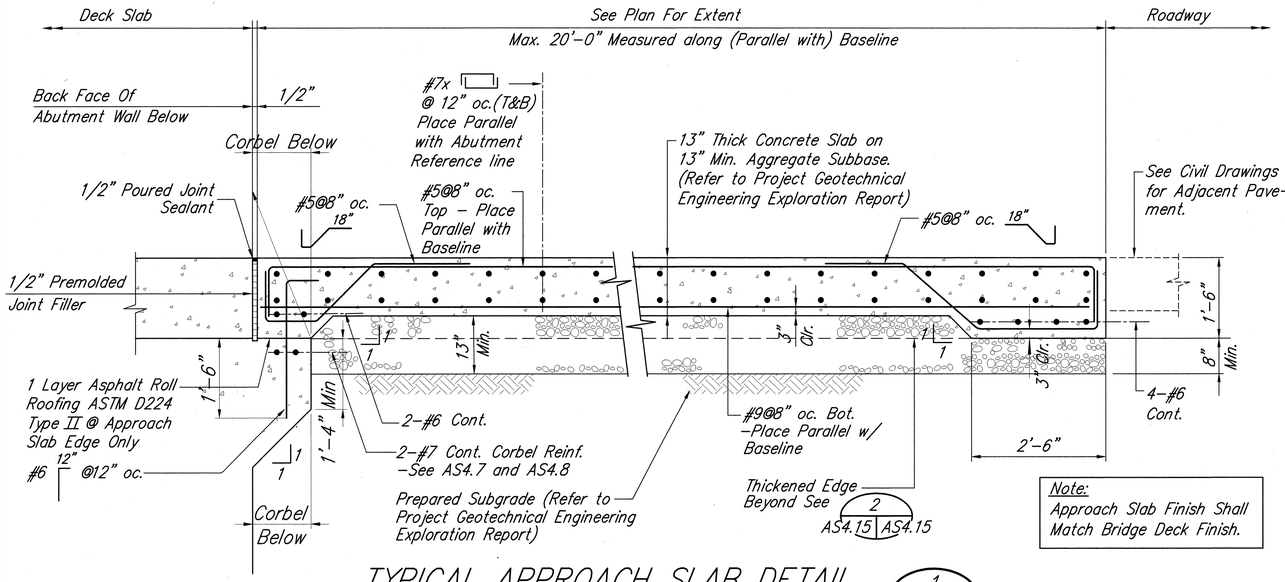
END POST DETAILS

MAMALAHOA HIGHWAY
REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

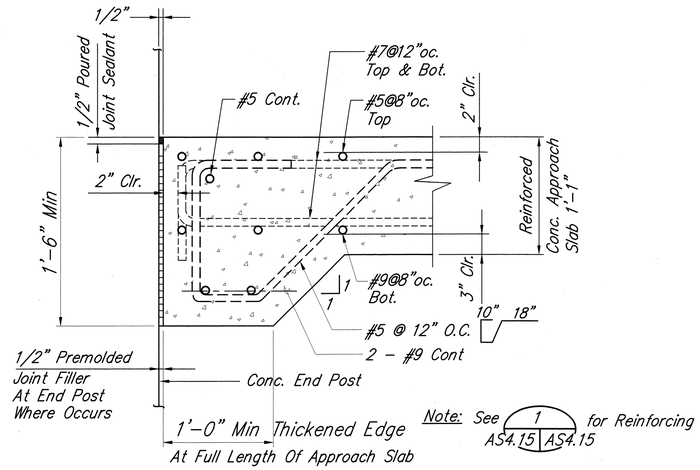
SHEET No. AS4.14 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	59	145



TYPICAL APPROACH SLAB DETAIL 1 AS4.15 AS4.15

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



TYPICAL JOINT DETAIL AT CONCRETE END POST 2 AS4.15 AS4.15

Not to Scale

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

1 0 1 2FT

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

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Mitsunaga & Associates, Inc.

DATE	DESCRIPTION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

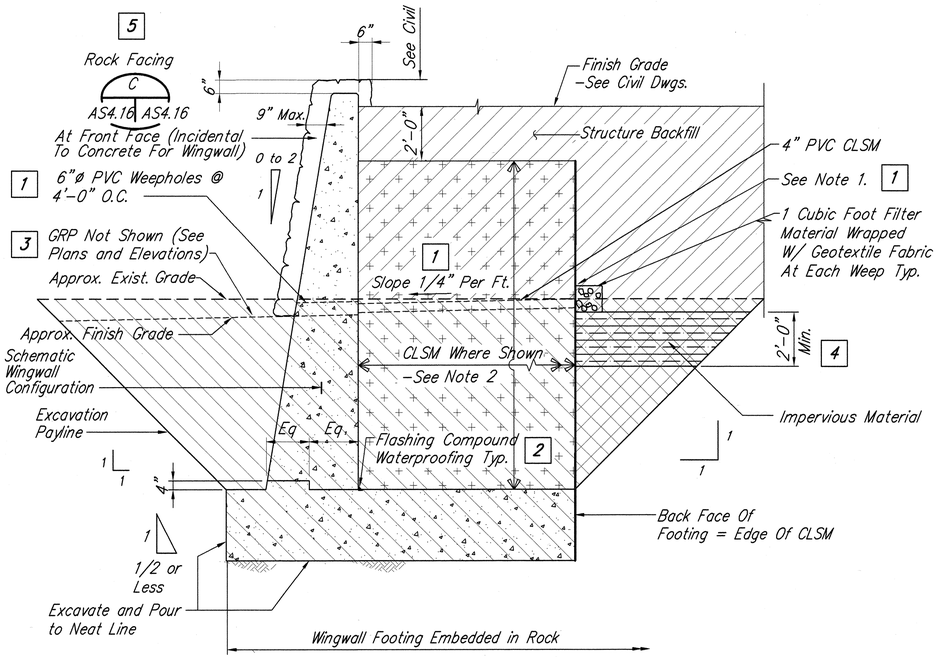
APPROACH SLAB DETAILS

MAMALAHOA HIGHWAY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

SHEET No. AS4.15 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12 (2)	2001	60	145



Note:

1. Provide 6" square aluminum or galvanized steel wire, 1/4" mesh hardware cloth (minimum wire diameter 0.025"). Anchor firmly to backface.
2. CLSM Shall Be Formed and Placed At 4'-0" Maximum Lifts. CLSM Lifts Shall Be Placed No Less Than 24 Hours After The Completion of the Previous CLSM Lift. Roughen CLSM Surfaces to 1/4" Minimum Roughness .
3. Provide 6" P.V.C. Drains At Wingwall. Extend 4" P.V.C. Through CLSM. Provide 1 Cubic Foot Filter Material Wrapped With Geotextile fabric At Each Drain Typical.
4. Space P.V.C. Drains At 4'-0" At Wingwalls.

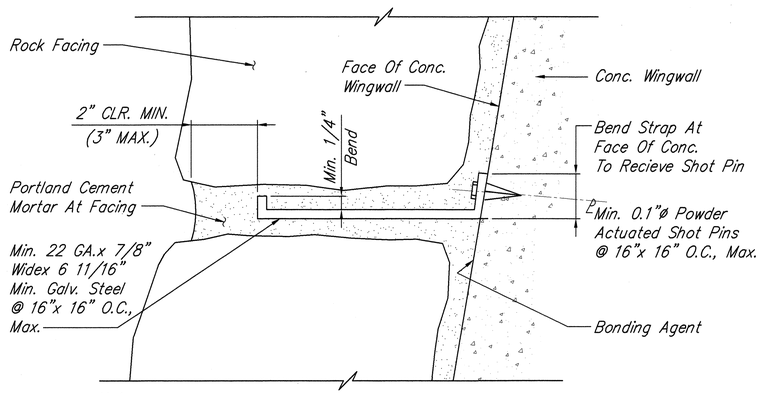
WINGWALL EXCAVATION and BACKFILL PAYLIMITS

A AS4.16 | AS4.16

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

Legend:

- Structure Excavation
- Structure Backfill
- 4 Impervious Material
- Class "D" Concrete Backfill
- CLSM Backfill



Notes:

1. Shot Pin Shall Be For Applications in Corrosive Environments (Corrosion Resistant).
2. Shot Pins Shall Be Approx. 1/8" Diameter And Penetrate The Concrete Wall 1" Minimum, 1 1/2" Maximum.
3. Safe Pullout Resistance For Shot Pin Shall Be 125 lbs. Min.

ROCK FACING DETAIL

C 5 AS4.16 | AS4.16

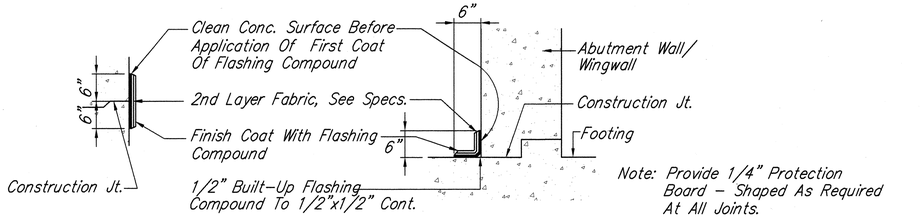
Scale: 6" = 1'-0"

Note:

1. Excavations for footings in Basalt Rock formation (including fractured rock and clinker materials) shall be kept to near-vertical (0.5H:1V) or steeper. Inadvertent over-excavations by the Contractor shall be cleaned of loose and fractured rock to expose intact rock. Concrete for the final footing shall be poured in contact with the sides of the excavation for the full for the full designed footing thickness. The resulting void space above the top of the footing shall be backfilled with Class D concrete where indicated . Backfilling the inadvertent over-excavations with footing concrete or Class D concrete will not be measured and paid for separately.
2. All footing excavations shall be cleaned of loose materials and highly fractured rock to the satisfaction of the Engineer.
3. The Engineer may direct the Contractor to over-excavate below the bottom of footing elevation and to the sides of the edges of the footing excavations. The additional over-excavation of the footing excavations, as directed by the Engineer, will be measured and paid for as structure excavation as indicated in the specifications.
4. The additional over-excavation as directed by the Engineer, below the bottom of footing elevation shall be backfilled with Class D concrete. This item will be measured and paid for as Structure Backfill for Abutments and Wingwalls (Class D concrete).

1 5. Geotextile 4" and 6" PVC shall be incidental to Structural backfill.

4 2 6. Impervious material as selected by the Engineer shall be made as Impervious as possible by Pneumatic Tamping or other approved methods and shall be incidental to Structure Backfill.



TYPICAL FLASHING COMPOUND WATERPROOFING DETAIL

B AS4.7, AS4.8 AS4.16 | AS4.16

N.T.S.

DATE	DESCRIPTION
07-31-01	5 Added Rock Facing Detail
07-31-01	4 Added Impervious Material
07-31-01	3 Corrected Notes
07-31-01	2 Added Notes
07-31-01	1 Corrected Rock Facing Extent

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXCAVATION and BACKFILL LIMITS

MAMALAHOA HIGHWAY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Feb. 2001

STEWART N. WILLIAMS
LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

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Mitsunaga & Associates, Inc.

2 0 2 4FT
SCALE: 3/8"= 1'-0"

SHEET No. AS4.16 OF 49 SHEETS

ADD. 60

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

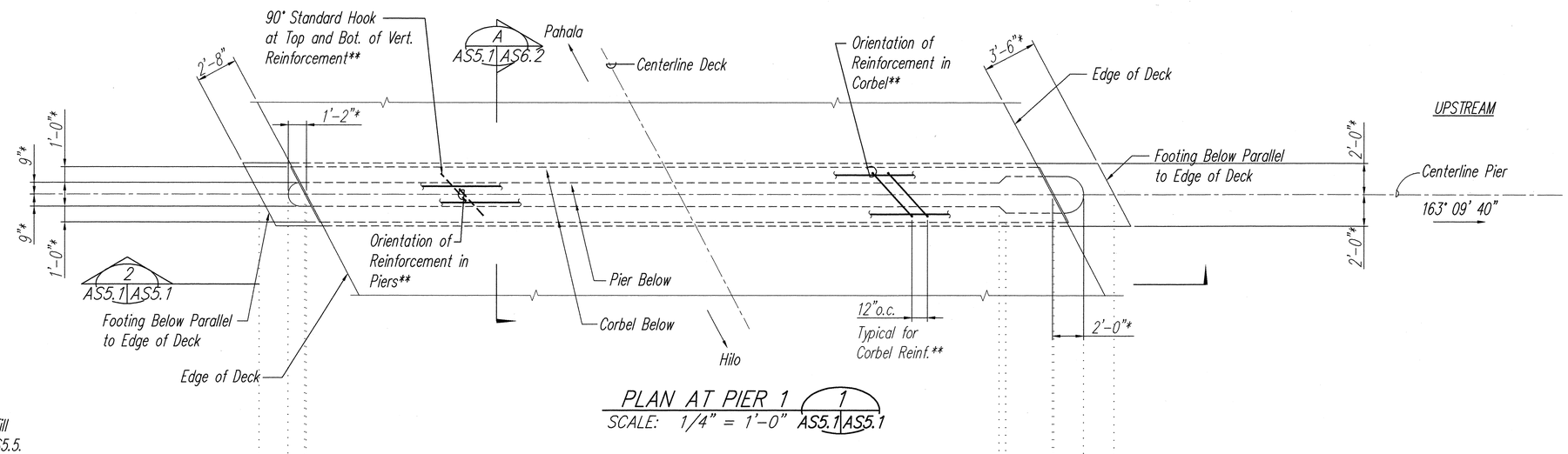
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	61	145

DOWNSTREAM

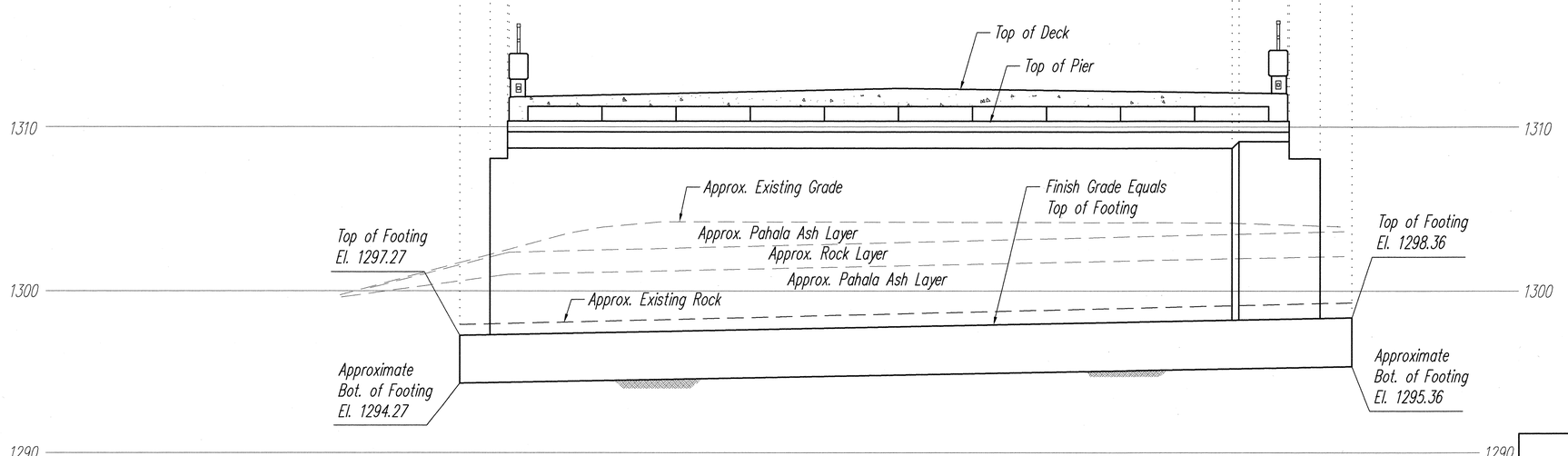
UPSTREAM

Notes:

1. All Dimensions (*) Typical to Piers 1, 2,and 3 Unless Otherwise Noted.
2. Notes Designated by (**) Show Spacing for Corbel Reinforcing and Rebar Orientation, and Applies to Piers 1, 2, and 3. For Sections and Details Showing Reinforcing, See Sheet AS6.2.
3. For Structural Excavation and Backfill Pay Limits, See Sheet AS5.4 and AS5.5.



PLAN AT PIER 1 (1 AS5.1 AS5.1)
SCALE: 1/4" = 1'-0"



SECTION AT PIER 1 (2 AS5.1 AS5.1)
SCALE: 1/4" = 1'-0"

GRAPHIC SCALE:

1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

4' 2' 0 4' 8'
SCALE: 1/4" = 1'-0"

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David K. Fujiwara

KSF, Inc.

ORIGINAL PLAN
NOTE BOOK
No.

SURVEY PLOTTED BY
DRAWN BY AST
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE Jan. 2001

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN AND SECTION

PIER 1

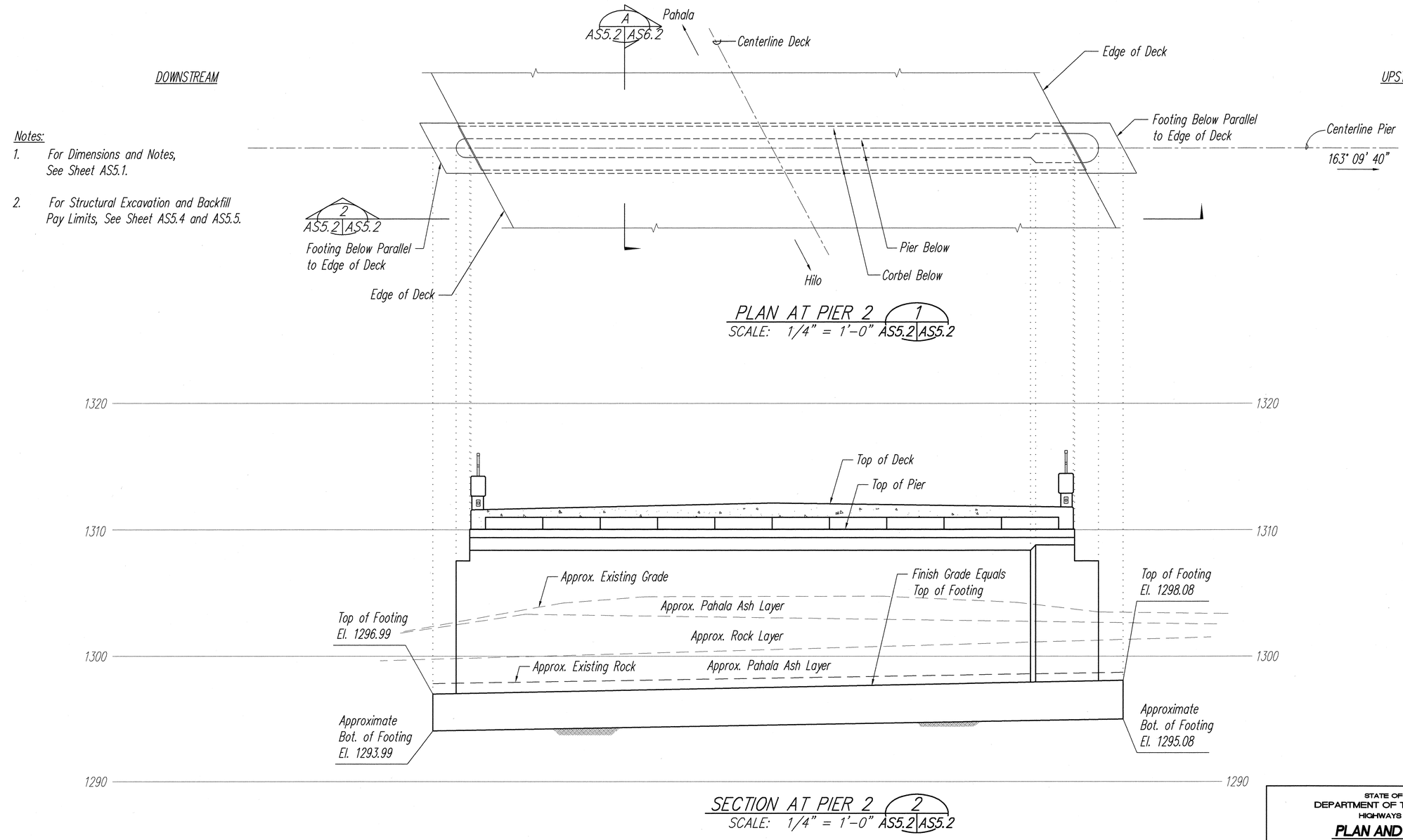
MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS5.1 OF 49 SHEETS

61

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	62	145



PLAN AT PIER 2 (1) AS5.2 AS5.2
SCALE: 1/4" = 1'-0"

SECTION AT PIER 2 (2) AS5.2 AS5.2
SCALE: 1/4" = 1'-0"

Notes:

1. For Dimensions and Notes, See Sheet AS5.1.
2. For Structural Excavation and Backfill Pay Limits, See Sheet AS5.4 and AS5.5.

GRAPHIC SCALE:

1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

4' 2' 0 4' 8'
SCALE: 1/4" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE Jan. 2001
	DRAWN BY KST	
NOTE BOOK	TRACED BY	
No.	DESIGNED BY KSF	
	QUANTITIES BY	
	CHECKED BY	

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David K. Fujiwara

KSF, Inc.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN AND SECTION

PIER 2

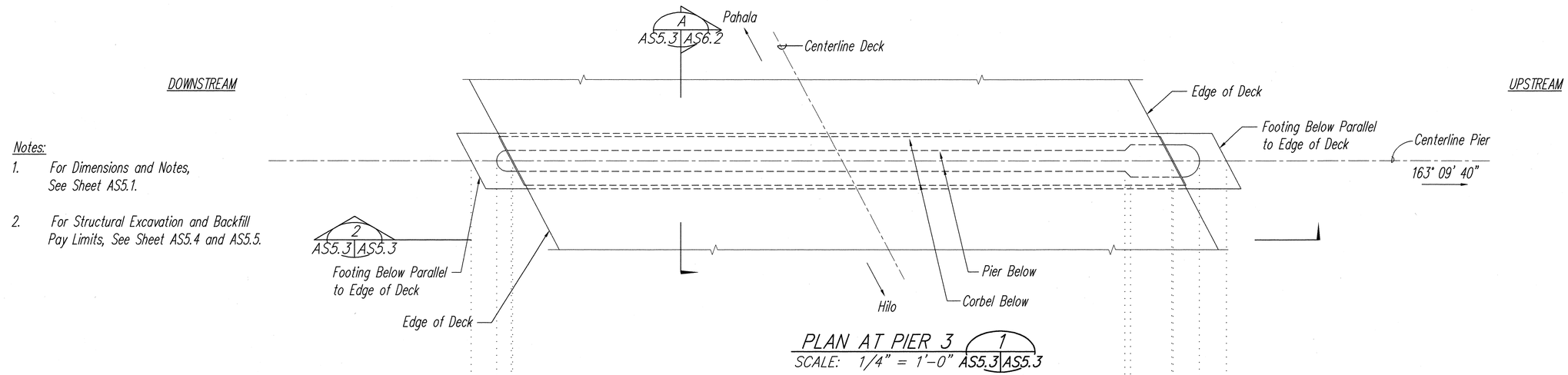
MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS5.2 OF 49 SHEETS

62

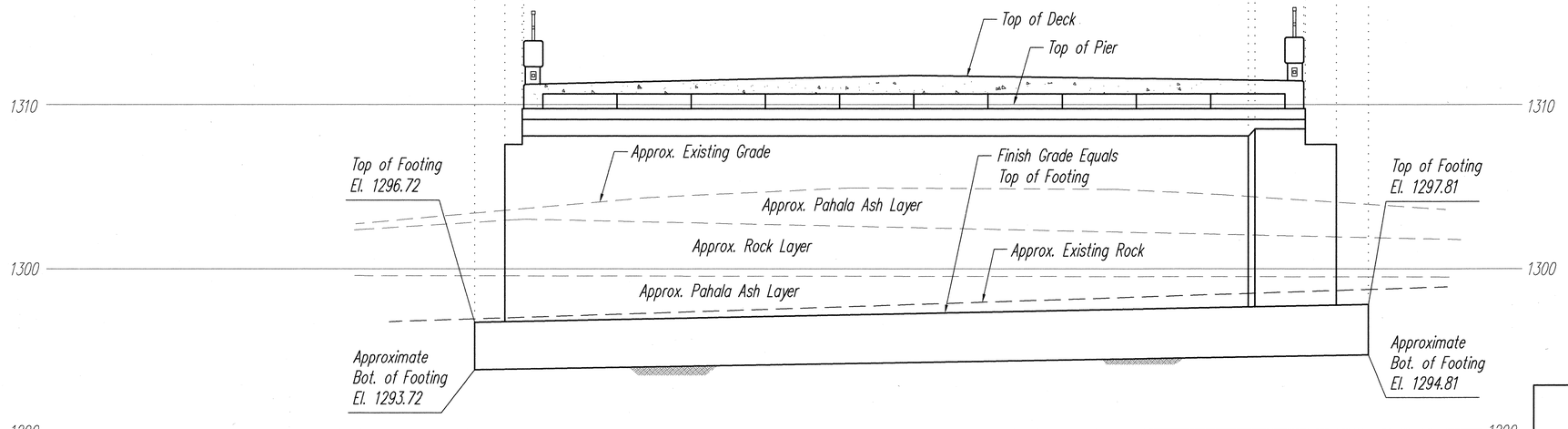
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	63	145



PLAN AT PIER 3 (1 AS5.3 AS5.3)
SCALE: 1/4" = 1'-0"

Notes:

1. For Dimensions and Notes, See Sheet AS5.1.
2. For Structural Excavation and Backfill Pay Limits, See Sheet AS5.4 and AS5.5.



SECTION AT PIER 3 (2 AS5.3 AS5.3)
SCALE: 1/4" = 1'-0"

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"
4' 2' 0 4' 8'
SCALE: 1/4" = 1'-0"

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KSF, Inc.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE Jan. 2001
	DRAWN BY VSY	
	TRACED BY	
NOTE BOOK	DESIGNED BY KSF	
	QUANTITIES BY	
No.	CHECKED BY	

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN AND SECTION

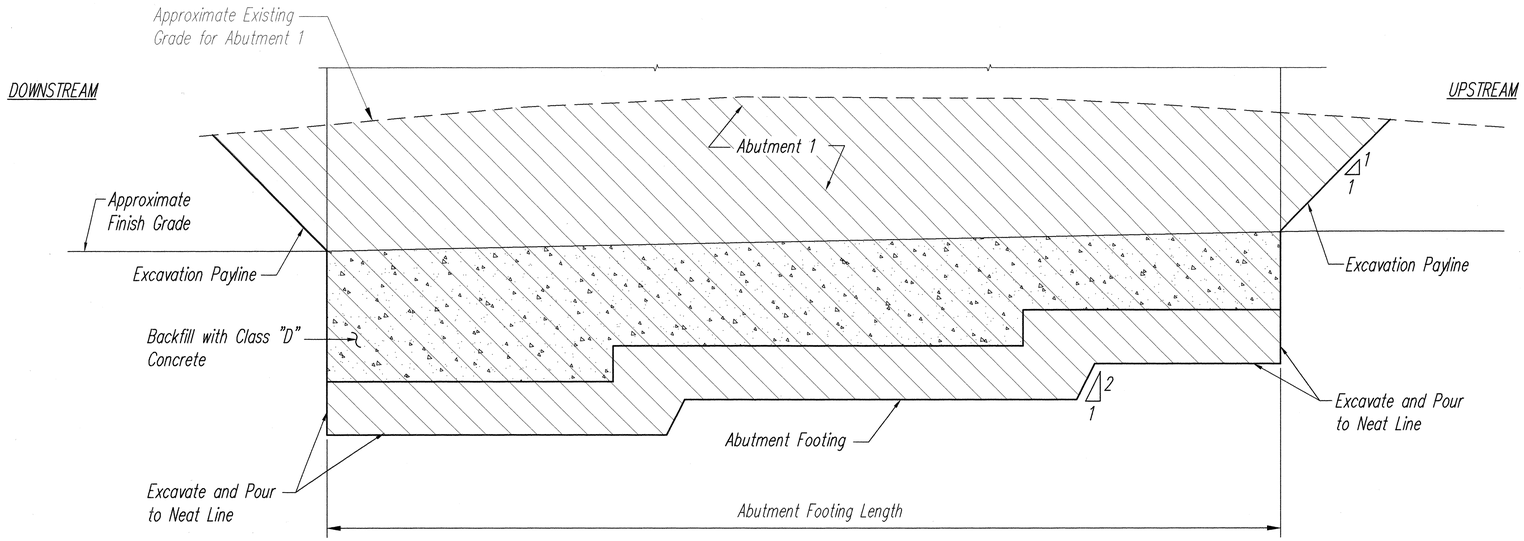
PIER 3

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS5.3 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	64	145

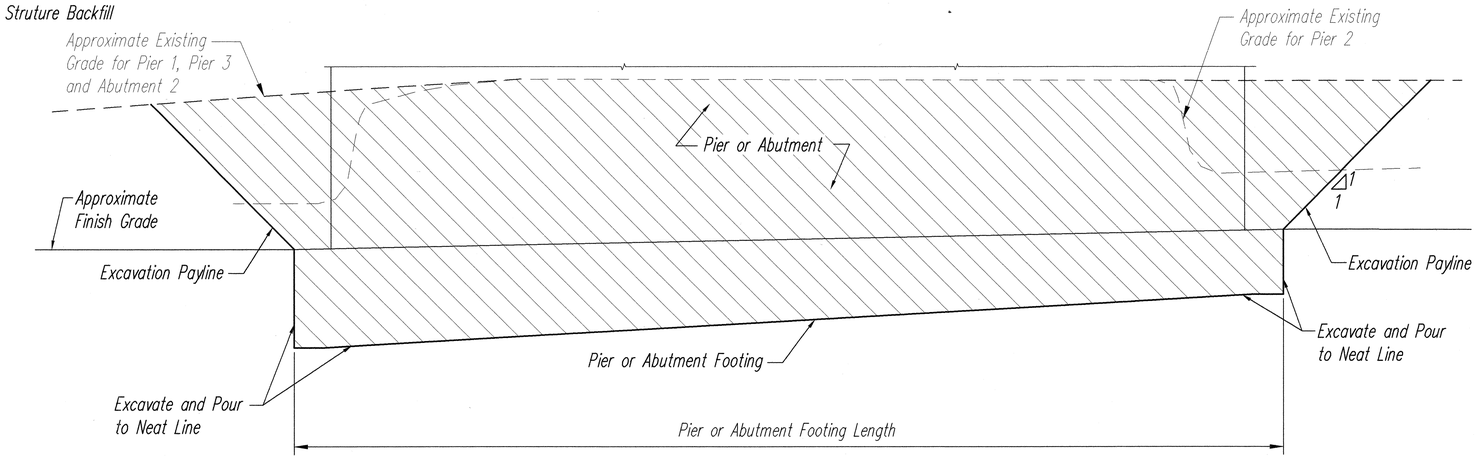


EXCAVATION PAYLIMITS FOR ABUTMENT 1 (A)
Scale: 1/4' = 1'-0" AS5.4 | AS5.4

Note:
See Sheet AS4.16 and Civil Plans for Remainder of Excavation Work.

LEGEND:

- Structure Excavation
- Class "D" Concrete Backfill
- Struture Backfill



EXCAVATION PAYLIMITS FOR PIER 1, PIER 2, PIER 3 AND ABUTMENT 2 (B)
Scale: 1/4' = 1'-0" AS5.4 | AS5.4

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LICENSED PROFESSIONAL ENGINEER
NO. 8104-S
HAWAII, U.S.A.

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KSF, Inc.

ORIGINAL PLAN
NOTE BOOK No. ____
SURVEY PLOTTED BY DATE FEB2001
DRAWN BY VSY
TRACED BY " "
DESIGNED BY KSF
QUANTITIES BY "
CHECKED BY "

GRAPHIC SCALE:
4' 2' 0 4' 8'
SCALE: 1/4" = 1'-0"

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

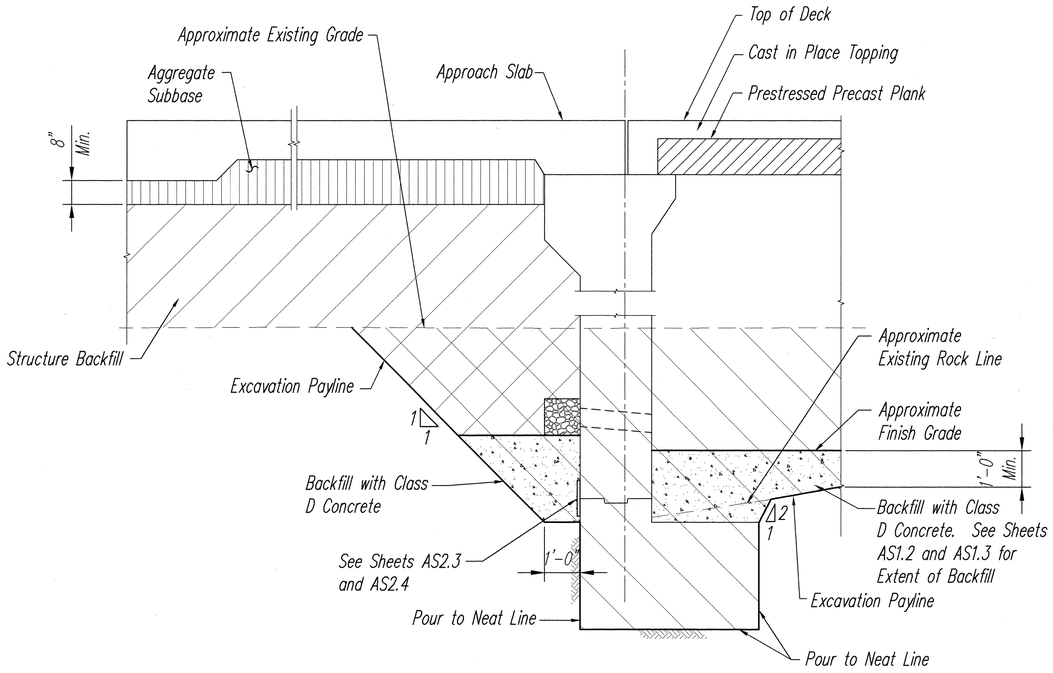
STRUCTURAL EXCAVATION AND BACKFILL PAYLIMTS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

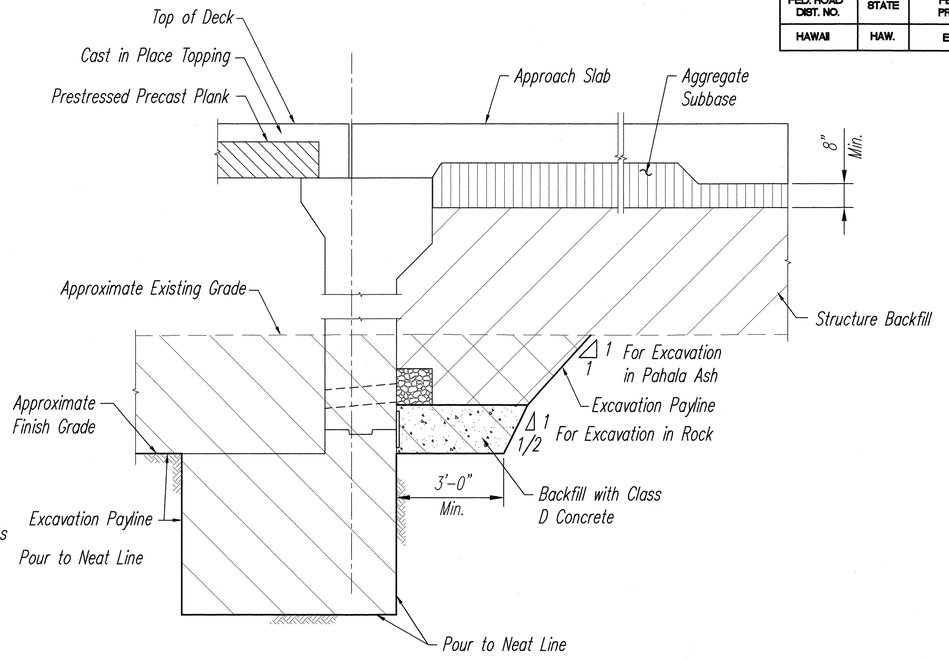
SHEET No. AS5.4 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	65	145



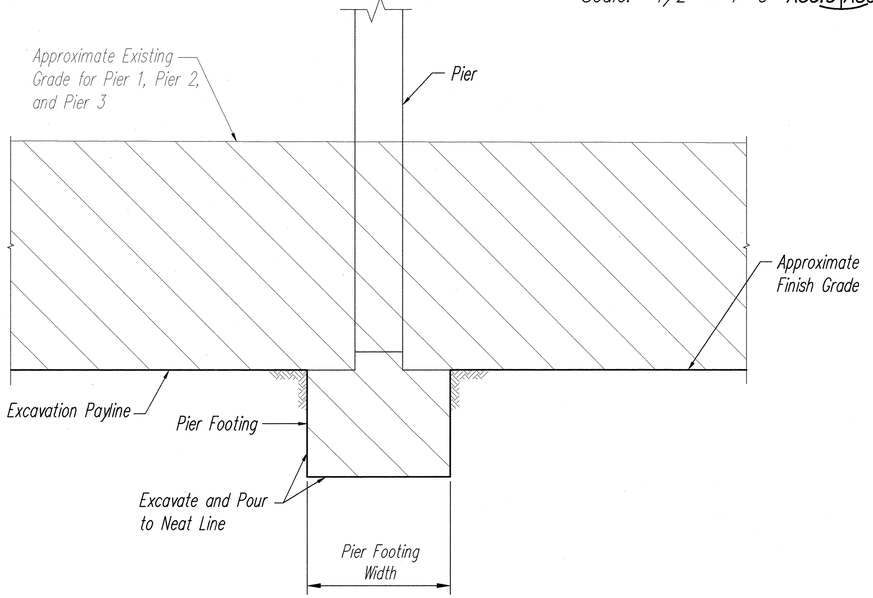
TYPICAL SECTION – ABUTMENT 1 (A)

Scale: 1/2" = 1'-0" AS5.5 | AS5.5



TYPICAL SECTION – ABUTMENT 2 (B)

Scale: 1/2" = 1'-0" AS5.5 | AS5.5



SECTION – EXCAVATION PAYLIMITS (C)

Scale: 1/2" = 1'-0" S5.5 | S5.5

NOTES:

1. Excavations for footings in basalt rock formation (including fractured rock and clinker materials) shall be kept to near-vertical (0.5H:1V or steeper). Inadvertent over-excavations by the Contractor shall be cleaned of loose and fractured rock to expose intact rock. Concrete for the final footing shall be poured in contact with the sides of the excavation for the full designed footing thickness. The resulting void space above the top of footing shall be backfilled with Class D concrete. Backfilling the inadvertent over-excavations with footing concrete or Class D concrete will not be measured and paid for separately.

2. All footing excavations shall be cleaned of loose materials and highly fractured rock to the satisfaction of the Engineer.

3. The Engineer may direct the Contractor to over-excavate below the bottom of footing elevation and to the sides of the edges of the footing excavation. The addtional over-excavation of the footing excavations, as directed by the Engineer, will be measured and paid for as structure excavation as indicated in the specifications.

4. The additional over-excavation as directed by the Engineer below the bottom of footing elevation shall be back-filled with Class D concrete. This item will be measured and paid for as Structure Backfill for Pier Footing (Class D concrete). Concrete for the final footing may be poured at least 3 days after the Class D concrete backfill pour.

5. Excavation and backfill shall follow the Construction Sequence on Sheet AS10.1 and the requirements included on the BMP's.

GRAPHIC SCALE:
4' 2' 0 4' 8'
SCALE: 1/4" = 1'-0"

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Mitsunaga & Associates, Inc.

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KSF, Inc.

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY VSY
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE FEB2001

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

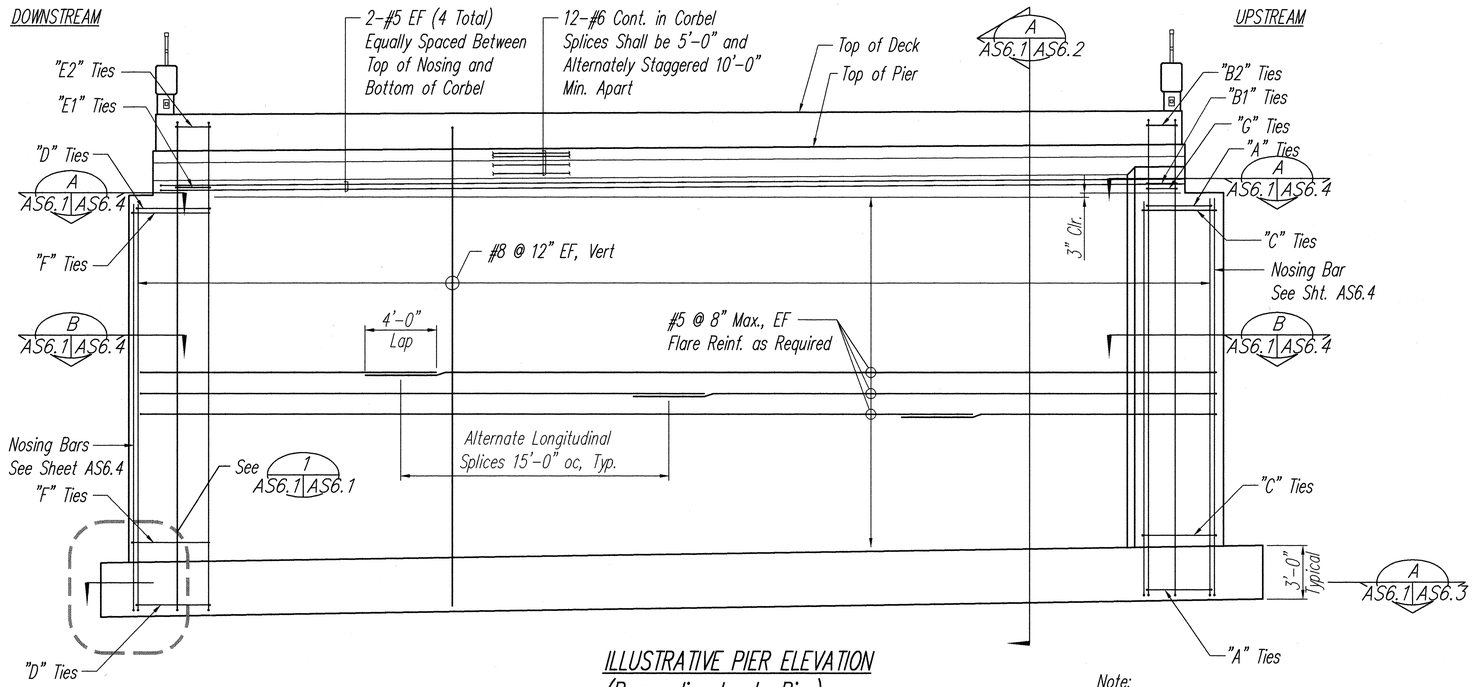
STRUCTURAL EXCAVATION AND BACKFILL PAYLIMITS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS5.5 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	66	145

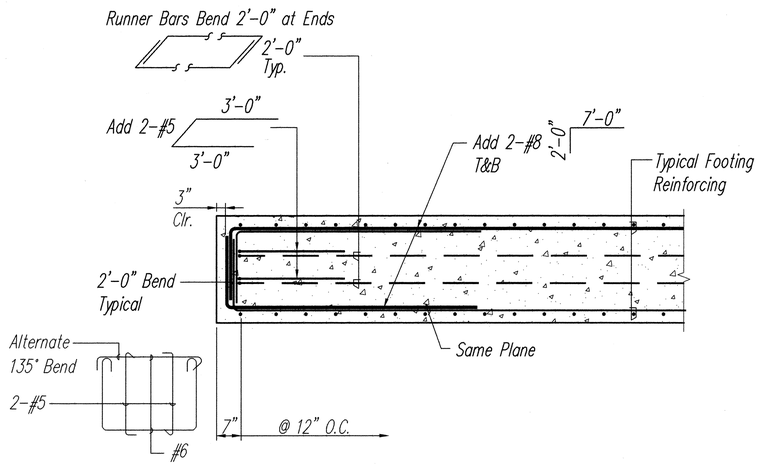


ILLUSTRATIVE PIER ELEVATION (Perpendicaular to Pier)

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

Note:

1. Splices Shall Not be Allowed for Vertical Bars.
2. For Tie Spacing and Type, See A AS6.1 AS6.4 & B AS6.1 AS6.4 B AS6.1 AS6.2



TYPICAL END CONDITION 1 AS6.1 AS6.1

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

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David K. Fujiwara

KSF, Inc.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE JAN2001
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NOTE BOOK	DESIGNED BY ASE	
	QUANTITIES BY	
No.	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL PIER ELEVATION AND DETAILS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS6.1 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	ADD. 67	145

Note:
For Remaining Reinforcing See 2 AS6.2 | AS8.2

Surface shall be Clean, Free of Laitance and shall be Intentionally Roughened to 1/4" Amplitude

Consecutive Cross Ties shall have their 90° Hooks on Opposite Side For Cross Tie Detail, See 1 AS6.2 | AS6.3

#5 @ 12"

3" (Typ.)

Cast in Place Topping

Prestressed Precast Plank

18" Min.

2" Clr.

3-#4 @ every #5 Varies

1'-0" (Typ.)

1

12-#6 Cont in Corbel

#5 @ 12"

2" Clr. to Ties

Place Slush Grout Immediately Prior to Placing Planks on Piers.

R=3/4"

2'-0"

Same Plane

2-#5 EF (4 Total) Equally Spaced Between Top of Nosing and Bottom of Corbel

Note:
For Tie Spacing, See B AS6.2 | AS6.2
For Tie Details, See 1 AS6.2 | AS6.3 and 3 AS6.2 | AS6.3

#8 @ 12" EF Vert.

3" Clr

#5 @ 8" Max. Spacing, EF

Construction Joint Surface Shall be Clean, Free of Laitance and Shall be Intentionally Roughened to 1/4" Amplitude Between Vertical Reinforcing

Consecutive Cross Ties Engaging the Same Longitudinal Bars Shall have Their 90 Degree Hooks on Top and Bottom of Footing.

See 2 AS6.2 | AS6.3

3" Clr to Tie

4"

2"

Added Reinforcing

2-#5 @ 12" For Tie Detail, See 1 AS6.2 | AS6.3

See Sheet AS6.3 for Reinforcing

3" Clr. to Tie

Embed 3'-0" Min. Into Rock

Added Reinforcing

3" Clr

3" Clr

Extend All Vert. Reinf. into Footing and Rest on Bot. Long. Reinf.

2-#6 Cont. Runner Bars Each Side (4 Total) Equally Spaced. Spliced Length and Locations Similar To A AS6.2 | AS6.3

PIER SECTION A
Scale: 1" = 1'-0" AS5.1 | AS6.2
AS5.2, AS5.3, AS6.1 AS6.3, AS6.4

30" @ 4" O.C. "E2" Ties

#4

90° Standard Hook

13" Min. to Outside End of Hook

For Plan of Top Reinf. Layout See 1 AS6.2 | AS6.4

Place Top Most Tie at Beginning of Vertical Reinf. Hook

30" @ 4" O.C. "B2" Ties

#4

2"

"B" or "E" Ties

@ 4" O.C. "E1" Ties

#4

3" Clr

Top of Downstream Pier Nosing

5"

3" Clr

Top of Upstream Pier Nosing

#4 @ 4" O.C. "B1" Ties

Concrete Pier

@ 4" O.C. ("D" Ties)

#4

2'-6"

@ 8" O.C.

#4 "F" Ties (Start Bottom Tie 3" Max. Above Top of Footing)

@ 8" O.C.

12"

#4

"C" Ties (Start Bot Tie 3" Max. above Top of Footing)

@ 8" O.C. "G" Ties

#4 @ 4" O.C. "A" Ties

"A" and "D" Ties

Construction Joint

2"

6"

2"

2"

Embed 3'-0" Min. Into Rock

Place Bottom Most Tie Beginning of Vertical Reinf. Hook

90° Standard Hook

SECTION B
Scale: 1" = 1'-0" AS6.1 | AS6.2
AS6.2, AS6.4

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

Notes:

1. For Types "A", "B", "C", "D", "E", "F" and "G" Ties, See Sht. AS6.4
2. For Tie Details, See 1 AS6.2 | AS6.3 and 3 AS6.2 | AS6.3
3. Cross ties shall have a 135° hook on one end and a 90° hook on the opposite end. Cross ties shall be placed so that 90° and 135° hooks of adjacent ties, horizontally and vertically shall be alternated.

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David K. Fujiwara

KSF, Inc.

DATE	DESCRIPTION
7-31-01	1 Add dimensions

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PIER SECTION

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS6.2 OF 49 SHEETS

ADD. 67

ORIGINAL PLAN	
NOTE BOOK	
No.	
SURVEY PLOTTED BY	
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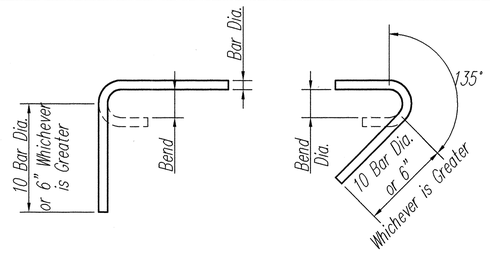
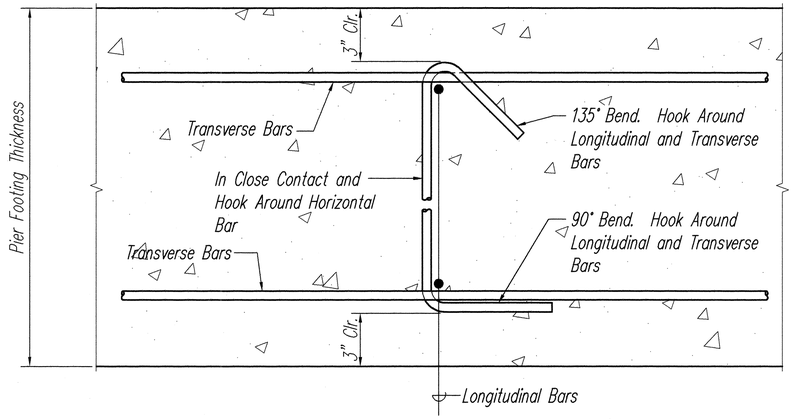
QUANTITIES BY	
CHECKED BY	
DATE DEC2000	

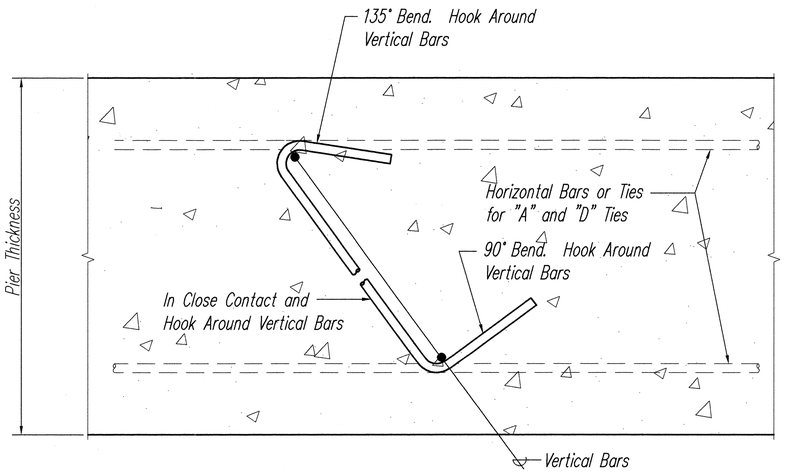
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	68	145



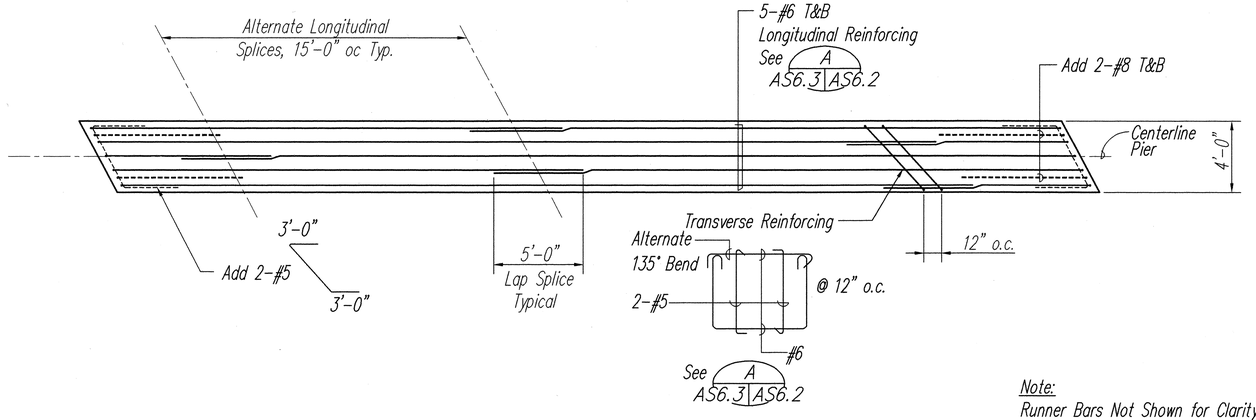
TIE REINFORCEMENT DETAIL 1
Not To Scale AS6.2|AS6.3



FOOTING TIE DETAIL 2
Not To Scale AS6.2|AS6.3



PIER TIE DETAIL 3
Not To Scale AS6.2|AS6.3



Note:
Runner Bars Not Shown for Clarity.

TYPICAL FOOTING REINFORCING PLAN A
Scale: 1/4" = 1'-0" AS6.1|AS6.3
AS6.2

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE FEB2001
	DRAWN BY AST	
NOTE BOOK	DESIGNED BY KSF	
No.	QUANTITIES BY	
	CHECKED BY	

DAVID K. FUJIWARA LICENSED PROFESSIONAL ENGINEER NO. 8104-S HAWAII, U.S.A.

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David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE:
4' 2' 0 4' 8'
SCALE: 1/4" = 1'-0"

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

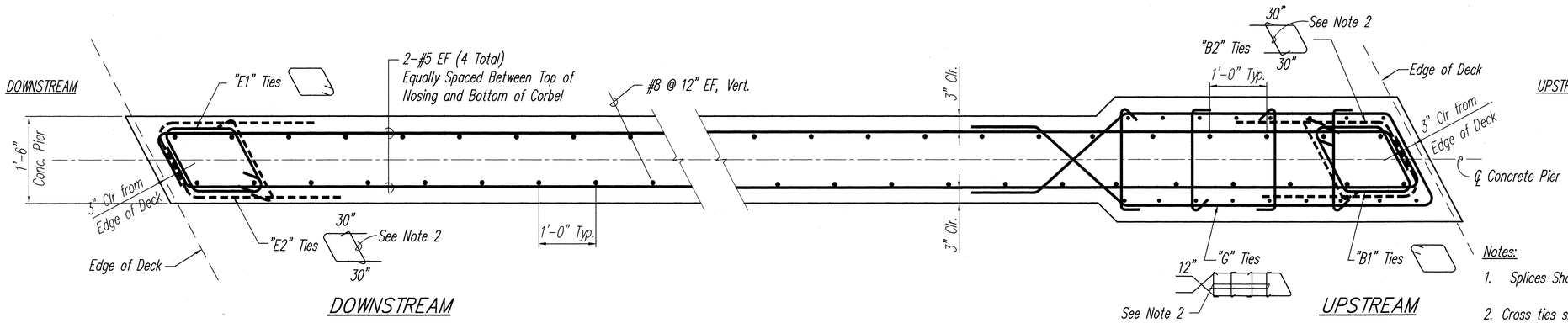
TYPICAL PIER FOOTING REINFORCING PLAN

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS6.3 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	69	145



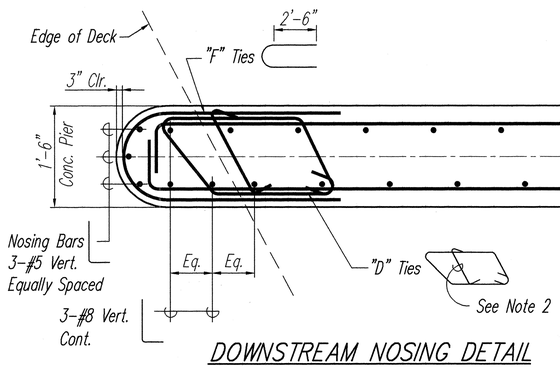
DOWNSTREAM

UPSTREAM

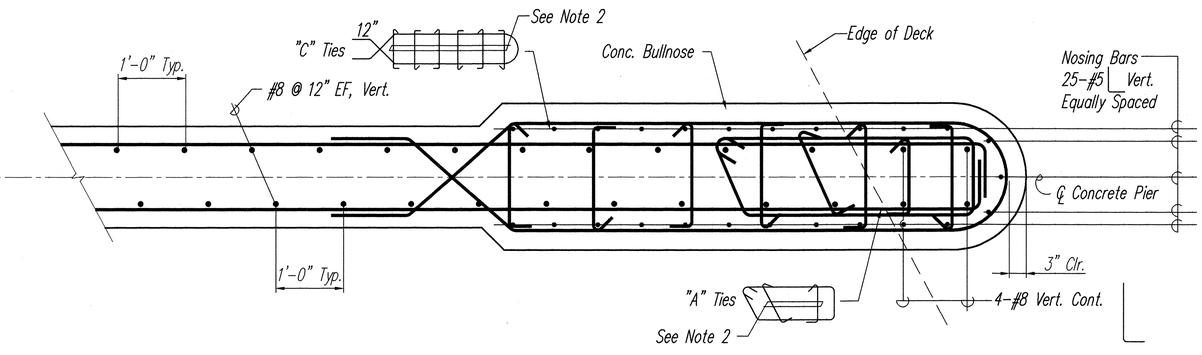
TYPICAL SECTION (A)
Scale: 1" = 1'-0" AS6.1 AS6.4

Notes:

1. Splices Shall Not be Allowed for Vertical Rebars.
2. Cross ties shall have a 135° hook on one end and a 90° hook on the opposite end. Cross ties shall be placed so that 90° and 135° hooks of adjacent ties, horizontally and vertically shall be alternated.



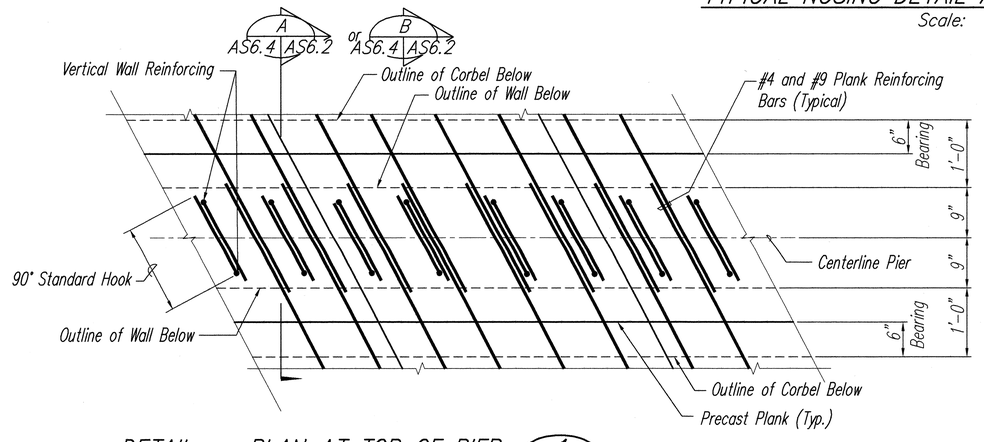
DOWNSTREAM NOSING DETAIL



UPSTREAM BUMPER NOSING DETAIL

Notes:

1. Splices Shall Not be Allowed for Vertical Rebars.
2. Cross ties shall have a 135° hook on one end and a 90° hook on the opposite end. Cross ties shall be placed so that 90° and 135° hooks of adjacent ties, horizontally and vertically shall be alternated.



DETAIL - PLAN AT TOP OF PIER (1)
Scale: 1" = 1'-0" AS6.2 AS6.4

TYPICAL NOSING DETAIL AT PIERS (B)
Scale: 1" = 1'-0" AS6.1 AS6.4

Notes:

1. Remaining Reinforcing Not Shown for Clarity
2. Contractor to Verify that There is No Conflict Between Vertical Wall Reinforcing and Plank Dowels

ORIGINAL PLAN
NOTE BOOK
No.

SURVEY PLOTTED BY
DRAWN BY JGT DATE JAN2001
TRACED BY " "
DESIGNED BY KSF " "
QUANTITIES BY " "
CHECKED BY " "

DAVID K. FUJIWARA
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NO. 8104-S
HAWAII, U.S.A.

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David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

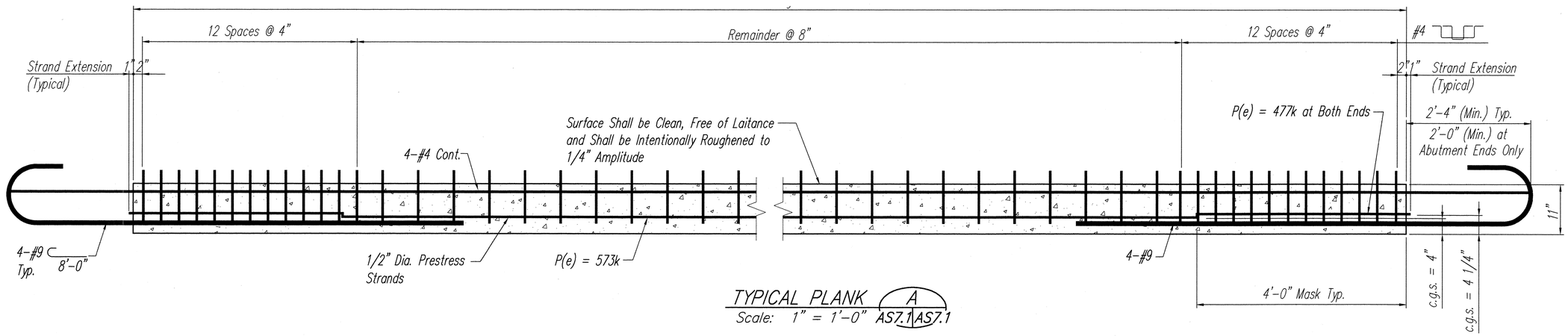
TYPICAL PIER DETAILS AND SECTION

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS6.4 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	70	145



TYPICAL PLANK A
Scale: 1" = 1'-0" AS7.1 AS7.1

PRESTRESSED PLANK NOTES

1. Prestressed concrete 28 day strength f'c = 6,000 PSI. Prestressed concrete strength at time of release fci = 4,500 PSI.
2. Pretensioned strands shall be 7 wire 1/2" ø low relaxation steel strands (Area = 0.153 in) with an ultimate tensile strength of 270 KSI. For properties, see "State Standard Specifications."
3. Non-prestressed reinforcing steel shall be grade 60. For properties, see "State Standard Specifications."
4. Strand pattern shall be symmetrical about the longitudinal ℄ of the plank.
5. Strand release sequence shall not induce any lateral deflection of the plank.
6. Contractor shall submit shop drawings indicating proposed strand pattern, releasing sequence, reinforcing details & hold down device details to the Engineer prior to fabrication.
7. During curing, care shall be taken to avoid any lateral deflection of the plank due to improper orientation. Steam curing may be used to accelerate strength gain.
8. Lifting devices shall be placed as close as possible to the centerline of bearings of the plank. Details and locations of lifting devices shall be submitted to the Engineer for approval. Such approval does not relieve the Contractor of his responsibilities if beam is damaged due to failure of the lifting device.
9. See Sheet AS8.1 for location of plank mark numbers.

ORIGINAL PLAN
NOTE BOOK No. ____
SURVEY PLOTTED BY
DRAWN BY VSY
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE Jan. 2001

DAVID K. FUJIWARA LICENSED PROFESSIONAL ENGINEER NO. 8104-S HAWAII, U.S.A.

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KSF, Inc.

GRAPHIC SCALE: 1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

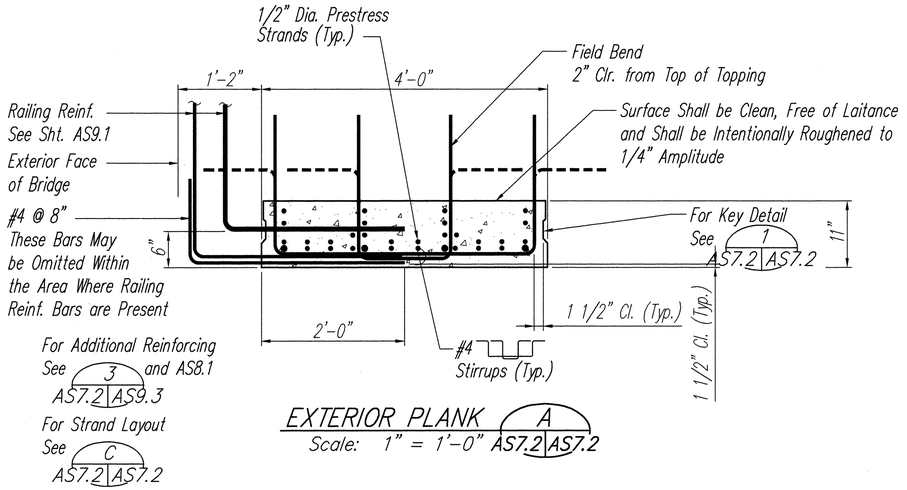
PRECAST PLANK SECTION AND DETAILS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

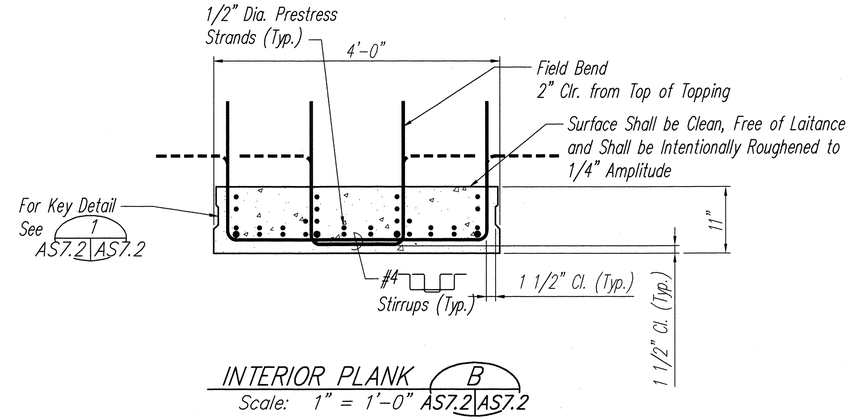
Scale: As Noted Date: Feb. 2001

SHEET No. AS7.1 OF 49 SHEETS

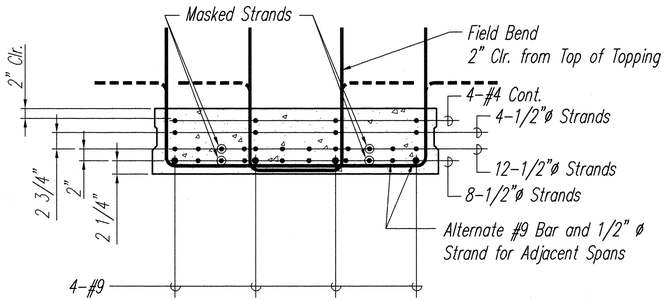
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	71	145



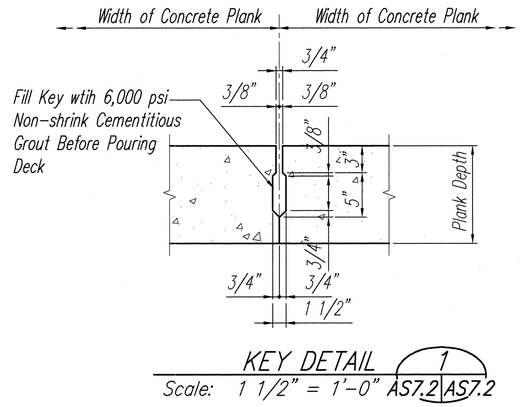
EXTERIOR PLANK A
Scale: 1" = 1'-0" AS7.2 AS7.2



INTERIOR PLANK B
Scale: 1" = 1'-0" AS7.2 AS7.2



PLANK REINF. C
Scale: 1" = 1'-0" AS7.2 AS7.2



KEY DETAIL 1
Scale: 1 1/2" = 1'-0" AS7.2 AS7.2

PRECAST PLANK PP1 AND PP2

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY ASY	Jan 2001
	TRACED BY ASY	
NOTE BOOK	DESIGNED BY KSF	
No.	QUANTITIES BY	
	CHECKED BY	

DAVID K FUJIWARA
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NO. 8104-S
HAWAII, U.S.A.

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David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE:

1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

1' 6" 0 1' 2'
SCALE: 1 1/2" = 1'-0"

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

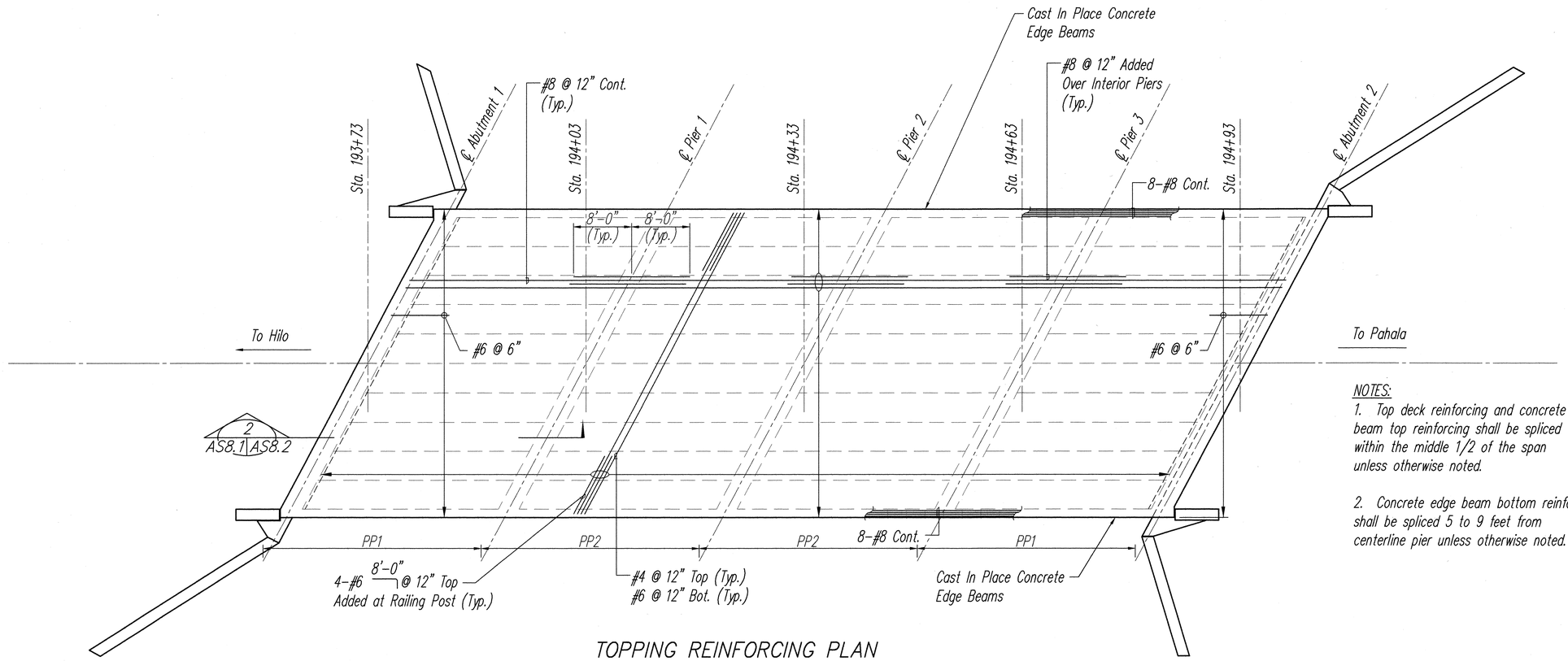
PRECAST PLANK SECTION AND DETAILS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS7.2 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	72	145



TOPPING REINFORCING PLAN

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

NOTES:

1. Top deck reinforcing and concrete edge beam top reinforcing shall be spliced within the middle 1/2 of the span unless otherwise noted.

2. Concrete edge beam bottom reinforcing shall be spliced 5 to 9 feet from centerline pier unless otherwise noted.

ORIGINAL PLAN
NOTE BOOK No. ____
SURVEY PLOTTED BY
DRAWN BY VST
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE DEC2000

DAVID K. FUJIWARA ★ LICENSED PROFESSIONAL ENGINEER ★ NO. 8104-S ★ HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE:

8' 4' 0 8' 16'
SCALE: 1/8" = 1'-0"

1' 0 1' 2' 3'
SCALE: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

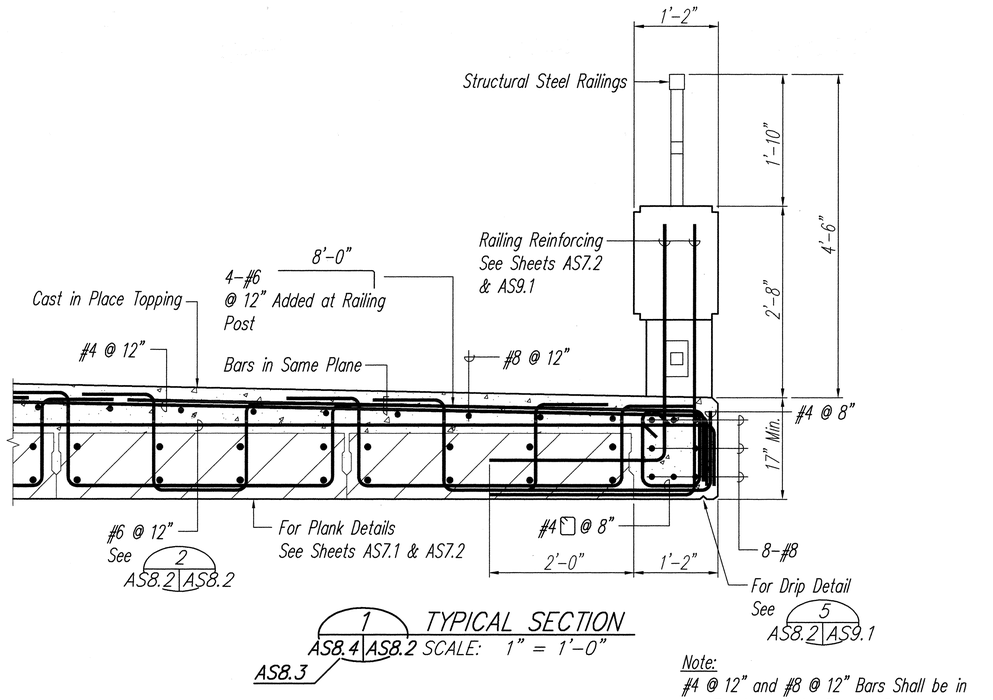
TOPPING REINFORCING PLAN

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

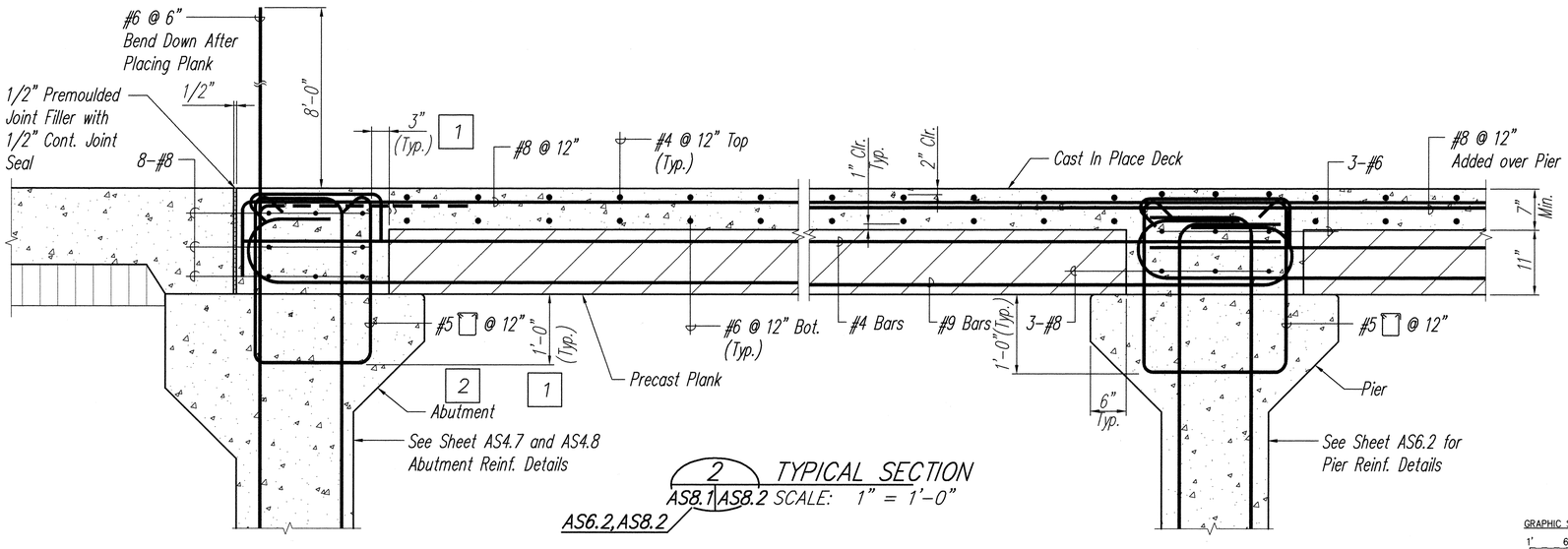
SHEET No. AS8.1 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	ADD. 73	145



1 AS8.4 | AS8.2 AS8.3 TYPICAL SECTION SCALE: 1" = 1'-0"

Note:
#4 @ 12" and #8 @ 12" Bars Shall be in the Top Mat of the Topping Reinforcing and Shall Follow the Slope of the Topping.



2 AS8.1 | AS8.2 AS6.2, AS8.2 TYPICAL SECTION SCALE: 1" = 1'-0"

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

DAVID K. FUJIWARA ★ LICENSED PROFESSIONAL ENGINEER ★ NO. 8104-S ★ HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

David K. Fujiwara

KSF, Inc.

ORIGINAL PLAN
SURVEY PLOTTED BY DATE DEC2000
DRAWN BY " "
TRACED BY " "
NOTE BOOK DESIGNED BY KSF
QUANTITIES BY
No. CHECKED BY

DATE	DESCRIPTION
7-31-01	2 Revise Note
	1 Add dimensions

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SECTIONS AND DETAILS

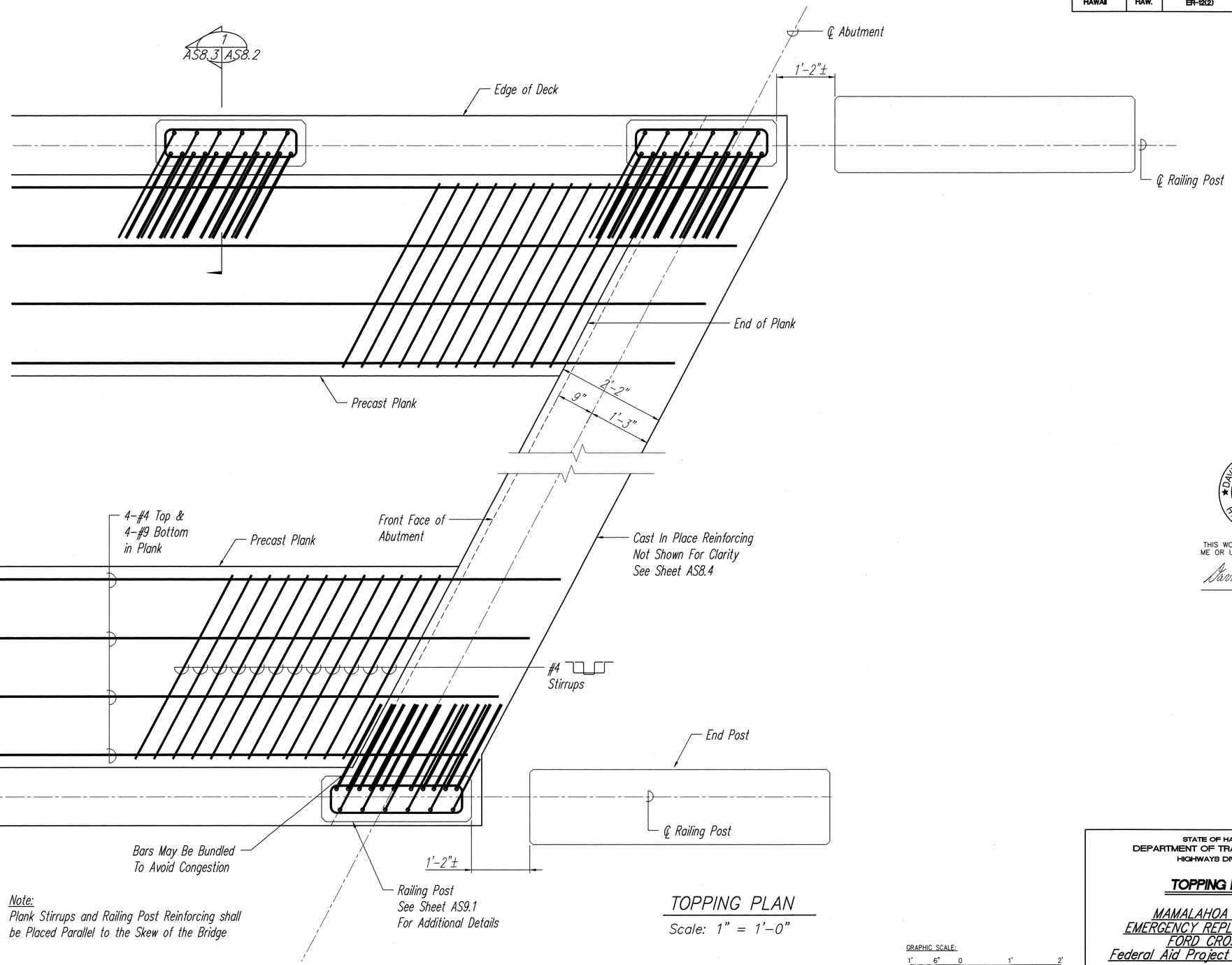
MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS8.2 OF 49 SHEETS

ADD. 73

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	74	145



Note:
Plank Stirrups and Railing Post Reinforcing shall be Placed Parallel to the Skew of the Bridge

TOPPING PLAN
Scale: 1" = 1'-0"

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

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David K. Fujiwara

KSF, Inc.

ORIGINAL PLAN
NOTE BOOK
No. ____

SURVEY PLOTTED BY
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TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE DEC2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

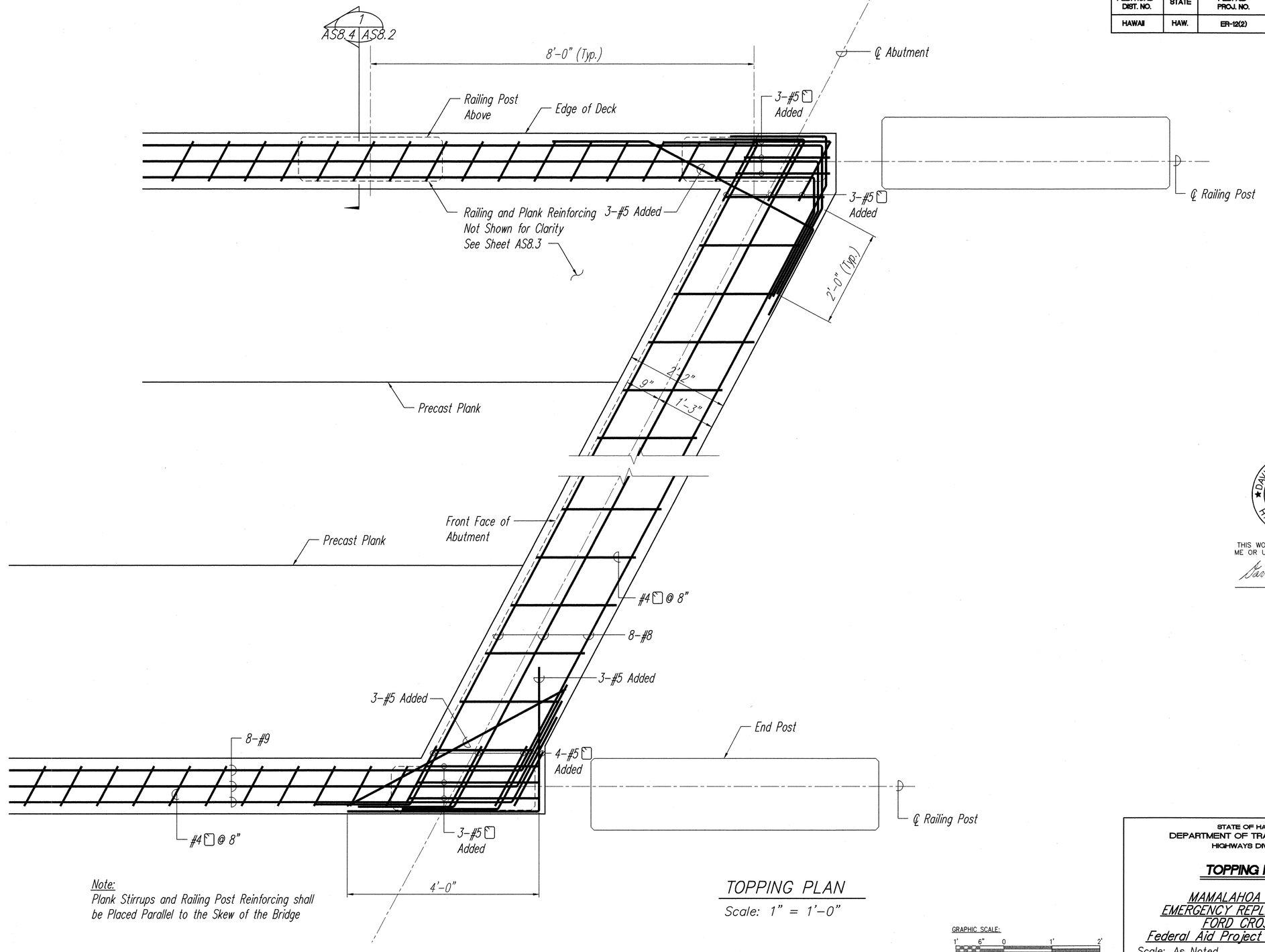
TOPPING PLAN

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS8.3 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	75	145



Note:
Plank Stirrups and Railing Post Reinforcing shall be Placed Parallel to the Skew of the Bridge

TOPPING PLAN

Scale: 1" = 1'-0"

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

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ORIGINAL PLAN
NOTE BOOK
No.

SURVEY PLOTTED BY
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TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE DEC2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

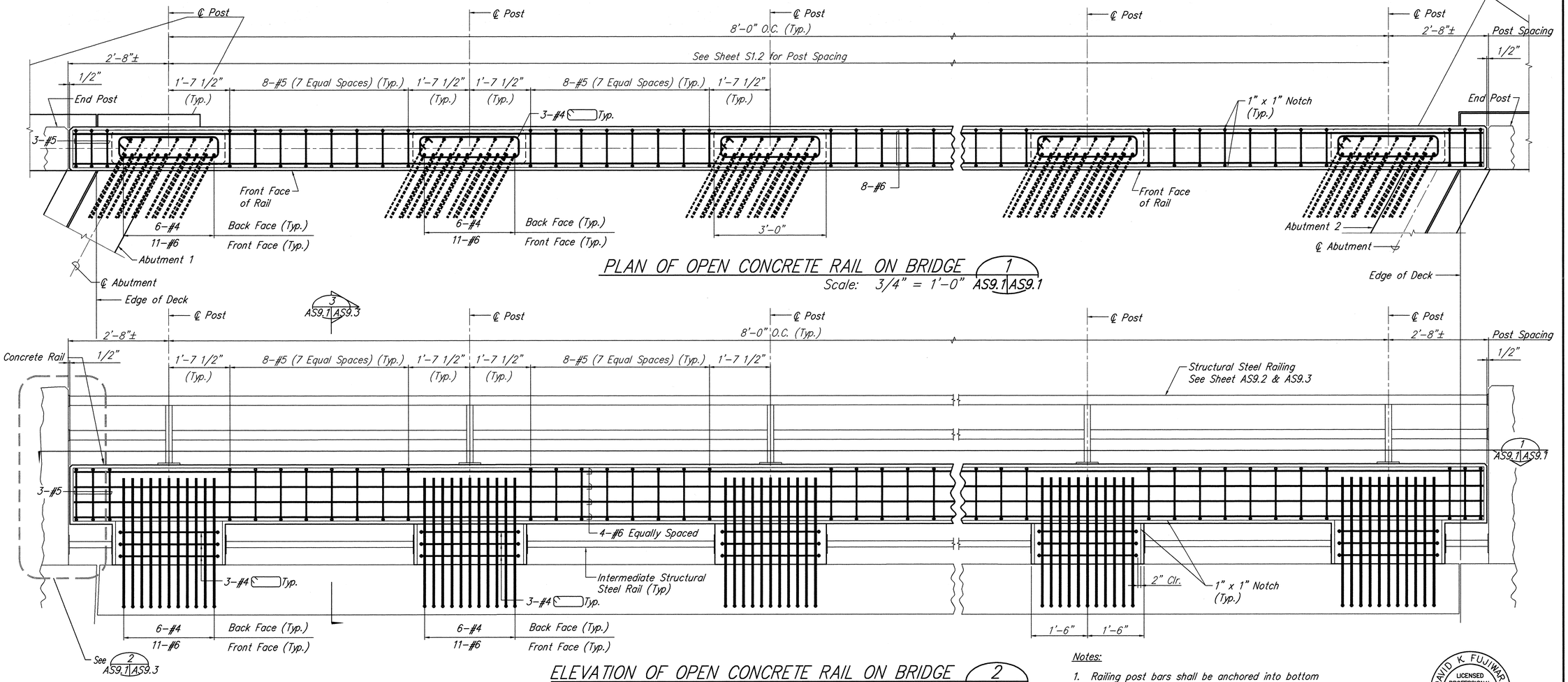
TOPPING PLAN

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

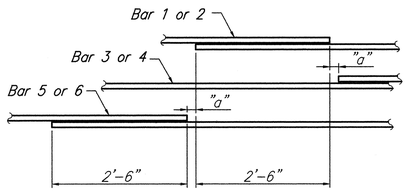
SHEET No. AS8.4 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	ADD. 76	145



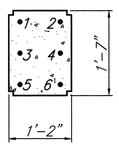
PLAN OF OPEN CONCRETE RAIL ON BRIDGE 1
Scale: 3/4" = 1'-0" AS9.1 AS9.1

ELEVATION OF OPEN CONCRETE RAIL ON BRIDGE 2
Scale: 3/4" = 1'-0" AS9.1 AS9.1



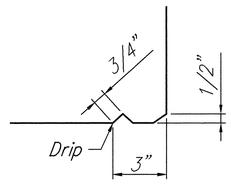
Laps for Bars 1 and 5 shall be staggered.
Laps for Bars 2 and 6 shall be staggered.
Bar 3 to be continuous through laps for Bars 1 and 5
Bar 4 to be continuous through laps for Bars 2 and 6
"a" ≥ Zero

LAP DETAIL 3
Not to Scale AS9.1 AS9.1



See Lap Detail

RAIL SECTION 4
Not to Scale AS9.1 AS9.1



DRIP DETAIL 5
Not to Scale AS8.2 AS9.1 AS9.3

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

Notes:

1. Railing post bars shall be anchored into bottom of planks or cast in place beam over piers.
2. Form work for concrete railing posts and sides and bottom of concrete railings shall not be removed for a minimum of 3 days or until the concrete has attained a strength of 2000 psi whichever occurs later. Railings between posts shall be reshored at midspan for a minimum of 11 days.

DATE	DESCRIPTION
7-31-01	1 Add note

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ORIGINAL PLAN
NOTE BOOK
SURVEY PLOTTED BY
DRAWN BY JSY
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE JAN2001
No.

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RAILING SECTION AND DETAILS

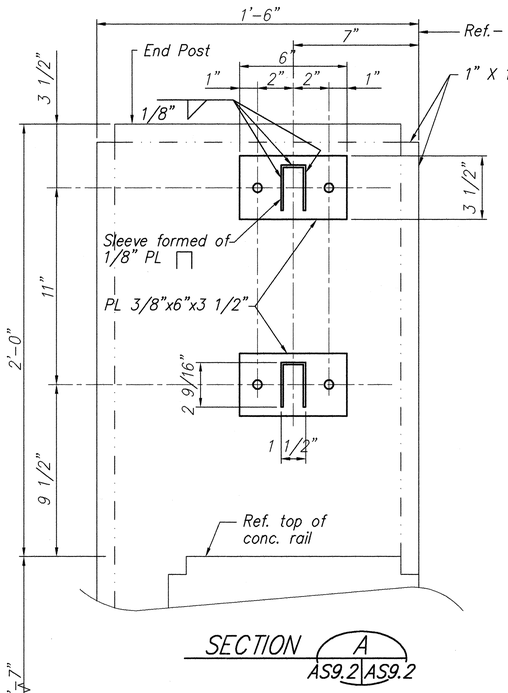
MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

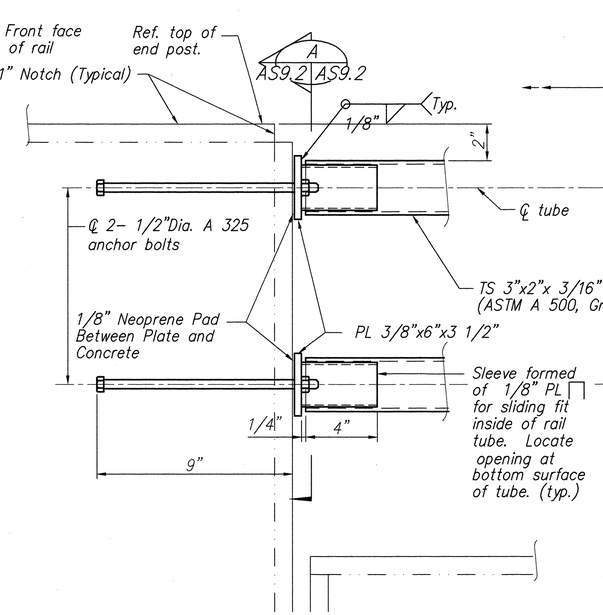
SHEET No. AS9.1 OF 49 SHEETS

ADD. 76

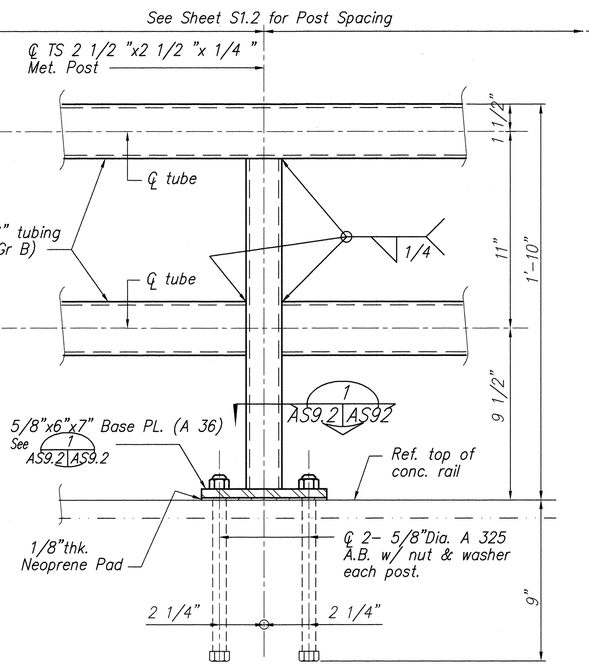
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	77	145



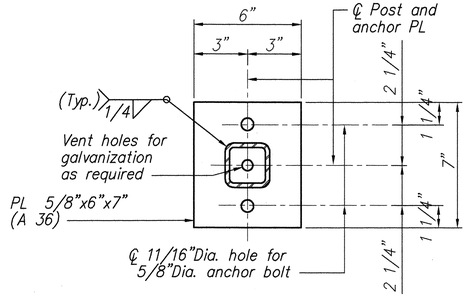
SECTION A AS9.2 | AS9.2



ELEVATION



ELEVATION
Scale: 3" = 1'-0"



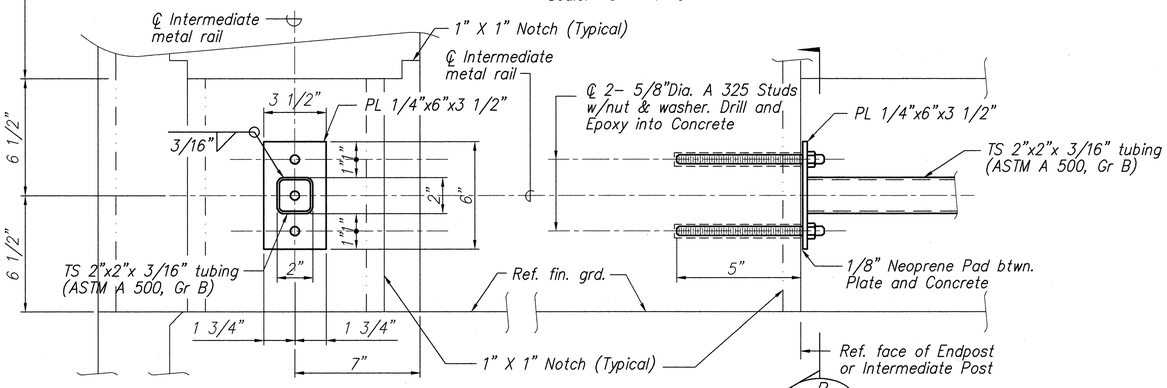
ANCHOR PLATE DETAIL 1 AS9.2 | AS9.2
Scale: 3" = 1'-0"

NOTE:

All structural steel members, plates and bolts shall be hot dipped galvanized after fabrication.

RAIL SLEEVE ANCHOR AT END POST CONNECTION DETAIL

Scale: 3" = 1'-0"



SECTION B AS9.2 | AS9.2

ELEVATION

INTERMEDIATE METAL RAIL DETAIL

(INCIDENTAL TO METAL BIKE RAILING)

Scale: 3" = 1'-0"

METAL BIKEWAY and INTERMEDIATE RAILING ON CONCRETE RAIL DETAILS

GRAPHIC SCALE:
1' 6" 0 1'
SCALE: 3" = 1'-0"

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ORIGINAL PLAN
NOTE BOOK
No.

SURVEY PLOTTED BY
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QUANTITIES BY
CHECKED BY
DATE JAN2001

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

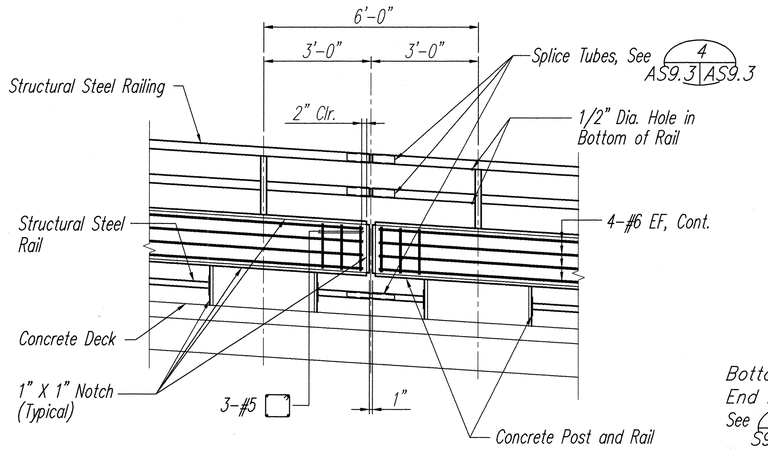
METAL BIKEWAY AND INTERMEDIATE RAILING ON CONCRETE RAILING DETAILS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

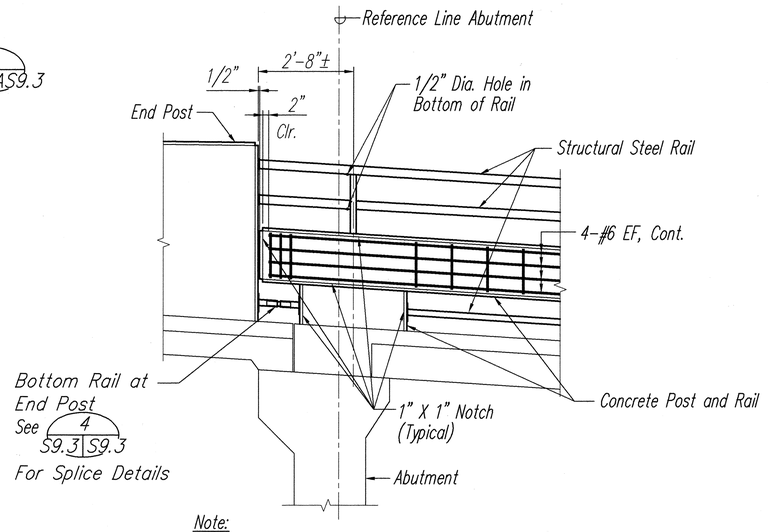
SHEET No. AS9.2 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	78	145



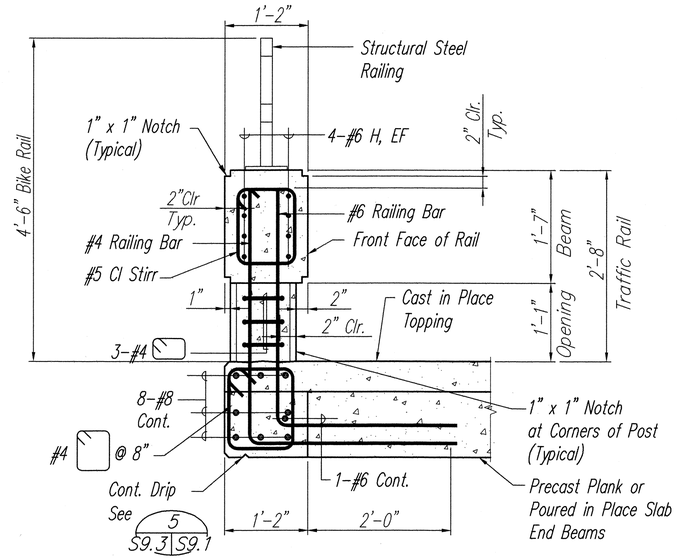
Note:
See Sheets AS9.1 and AS9.2 for Additional Details

TYPICAL RAILING EXPANSION JOINT 1
Scale: 1/2" = 1'-0" AS1.2 AS9.3

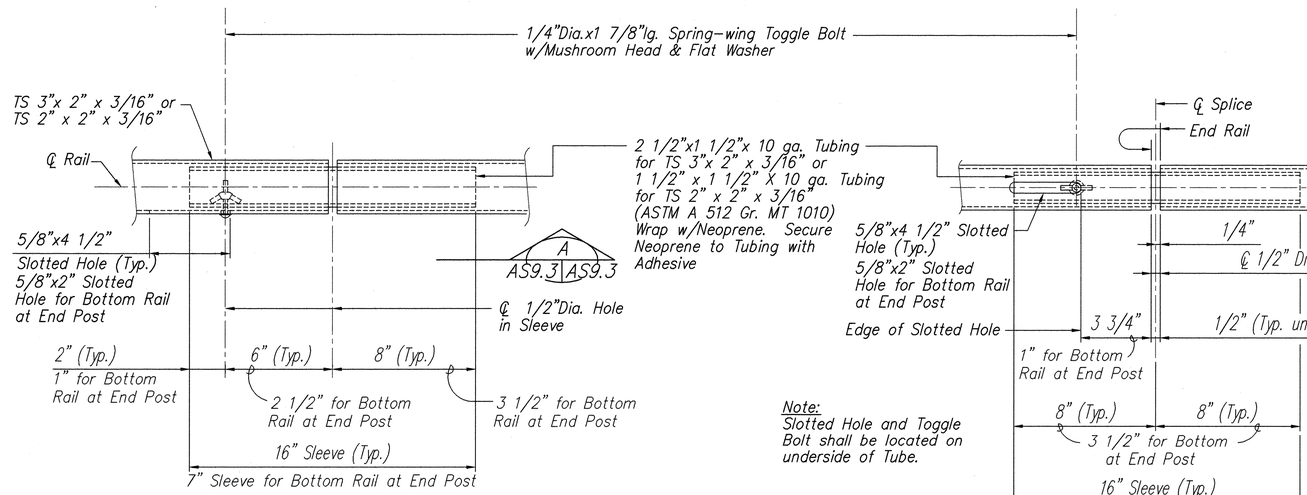


Note:
See Sheet AS9.1 and AS9.2 for Additional Details

TYPICAL RAILING DETAIL AT END Post 2
Scale: 1/2" = 1'-0" AS9.1 AS9.3 AS1.2

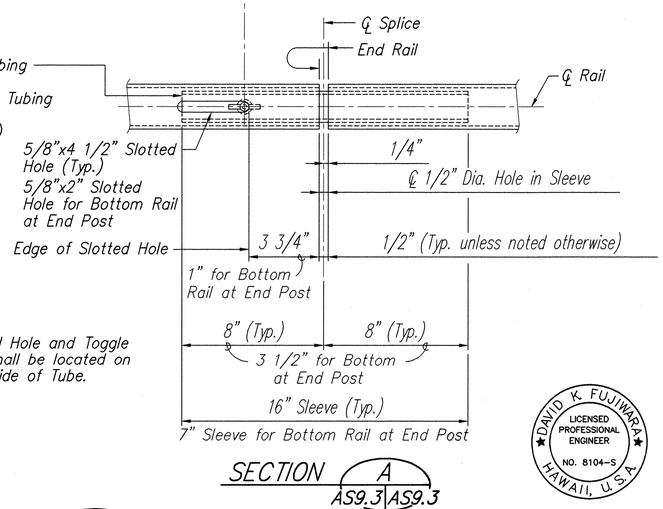


SECTION 3
SCALE: 1" = 1'-0" AS9.1 AS9.3 AS7.2



ELEVATION

Note:
Slotted Hole and Toggle Bolt shall be located on underside of Tube.



SECTION A AS9.3 AS9.3

TYPICAL TUBE SPLICE DETAIL 4
Not to Scale AS9.3 AS9.3

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David K. Fujiwara

KSF, Inc.

GRAPHIC SCALE:
1' 6" 0 1' 2'
SCALE: 1" = 1'-0"

ORIGINAL PLAN
NOTE BOOK
SURVEY PLOTTED BY
DRAWN BY VSY
TRACED BY
DESIGNED BY KSF
QUANTITIES BY
CHECKED BY
DATE JAN2001
No.

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RAILING SECTION AND DETAILS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS9.3 OF 49 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(2)	2001	79	145

CONSTRUCTION SEQUENCE

STAGE 1: Construct the following in accordance with the Bridge and Roadway Best Management Practices (BMP's):

(1) Abutments No. 1 and No. 2 Footings, Piers No. 2 and No. 3 Footings, Wingwalls No. 3 and No. 4 Footings
(2) Backfill with Class "D" concrete between Pier 3 and Abutment 2
(3) Backfill with Class "D" concrete and place GRP in Channel at Wingwalls 3 and 4
(4) Pier No. 1, Wingwalls No. 1 and No. 2 Footings
(5) Abutment No. 1 Wall Stem to Invert El.+0.5 ft. or greater
(6) Backfill with Class "D" concrete between Abutment 1 and Pier 1
(7) Backfill with Class "D" concrete and place GRP at Wingwalls 1 and 2
(8) Abutment Walls, Pier Walls and Wingwalls

NOTES

(A) Probing and Grouting are included in Stage 1.
(B) Abutment Walls, Pier Walls and Wingwalls may be poured at any time after their footings are poured providing they meet the requirements of the BMP's and specifications.
(C) Backfilling behind the Abutment Walls and Wingwalls shall not occur until the Class "D" Concrete in front of the Abutment Walls and Wingwalls shown on Sections 1/AS1.2 and A/AS2.1 has been poured and has attained a strength of 1000 psi or 7 days after the Class "D" concrete has been poured, whichever occurs later.

Note: Stages 2 through 4 will not require containment of work unless the Stream is flowing. Spilled Concrete on the Stream/Channel shall be removed in accordance with the Bridge and Roadway Best Management Practices (BMP's).

STAGE 2: Erect Precast Planks at least Seven (7) days after Pier and Abutment pour or until Pier and Abutment concrete has attained a compressive strength of 3,500 psi, whichever occurs later.

STAGE 3: Pour Deck Topping

STAGE 4: Construct Railings

STAGE 5: Bridge may be opened for Traffic after the concrete in the Topping and Railing have attained a compressive strength of 5,000 psi and 4,000 psi., respectively, or at least Seven (7) days after the latest pour, whichever occurs later.

STAGE 6: Remove Detour Road and construct embankments in accordance with the Detour Road and Embankments BMP's.

NOTE:

No more than one vehicle at one time shall be located on the fill behind the abutment until Seven (7) days after entire deck topping is poured or the topping has attained its Twenty-eight (28) day compressive strength whichever occurs later. This area shall be ocross the whole width of the abutment extending Twenty (20) feet back from the Abutment Wall. This applies to all vehicles over Ten (10) tons.

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

ROBIN M. LIM LICENSED PROFESSIONAL ENGINEER No. 8436-C HAWAII, U.S.A.

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Geolabs, Inc.

STEWART N. WILLIAMS LICENSED PROFESSIONAL ENGINEER NO. 3908-S HAWAII, U.S.A.

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Mitsunaga & Associates, Inc.

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KSF, Inc.

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION SEQUENCE

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF
FORD CROSSING
Federal Aid Project No. ER-12(2)

Scale: As Noted Date: Feb. 2001

SHEET No. AS10.1 OF 49 SHEETS