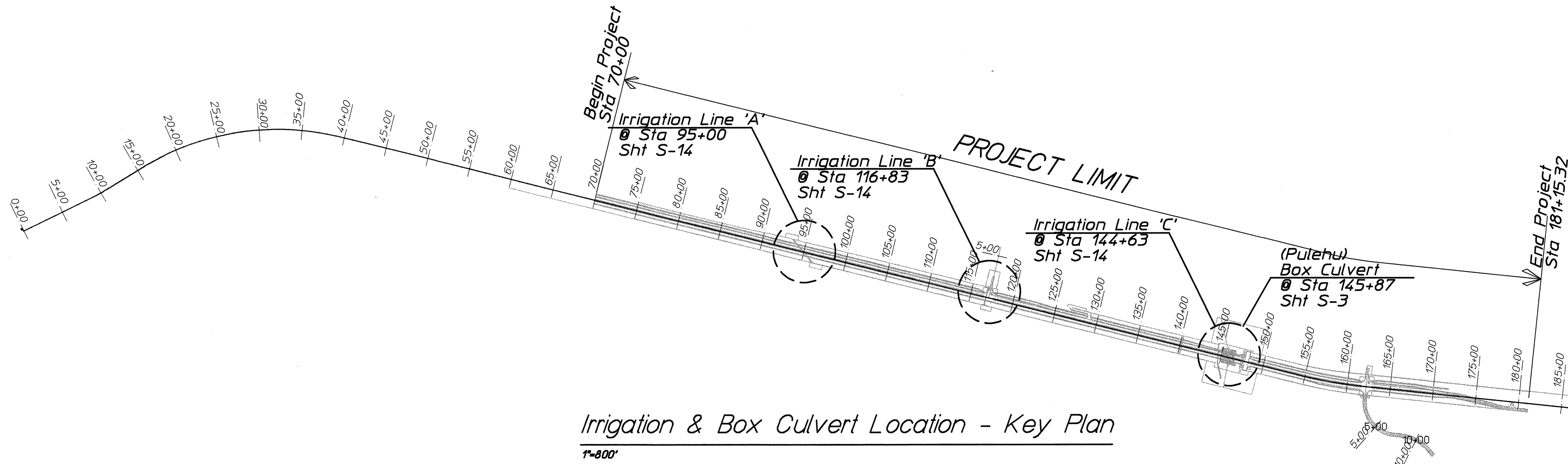


Plot date: 6-Jan-03

FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-0311(5)	2003	153	189



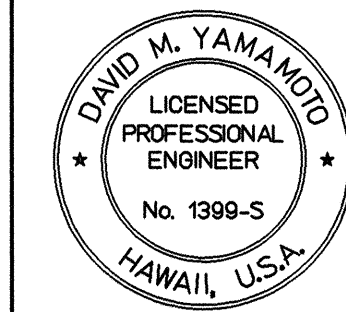
Irrigation & Box Culvert Location - Key Plan

1"=800'

Estimated Quantities

Item No.	Item	Estimated Quantity
206.4000	Structure Excavation for Irrigation & Box Culverts.....	13,700 CY
206.5000	Structure Excavation for Wing Walls.....	540 CY
206.7250	Structure Backfill for Wingwalls.....	400 CY
503.1030	Concrete in C.I.P Box Culverts (Incl Cut-Off Walls, Headwalls & Wingwalls).....	1,140 CY
507.1000	Metal Pedestrian Railing (1-Rail on Concrete Traffic Railing).....	153 LF
507.1500	Metal Bicycle Railing (2-Rail on Culvert Headwall & Wingwall).....	205 LF
507.7000	Concrete (Traffic) Railing.....	212 LF
509.1000	Precast Concrete Box Culverts (12'x8').....	641 LF
602.0030	Reinforcing Steel in C.I.P. Box Culverts (Incl Cut-Off Walls, Headwalls & Wing walls).....	216,000 LB

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	CHECKED BY	
	QUANTITIES BY	
	CHECKED BY	

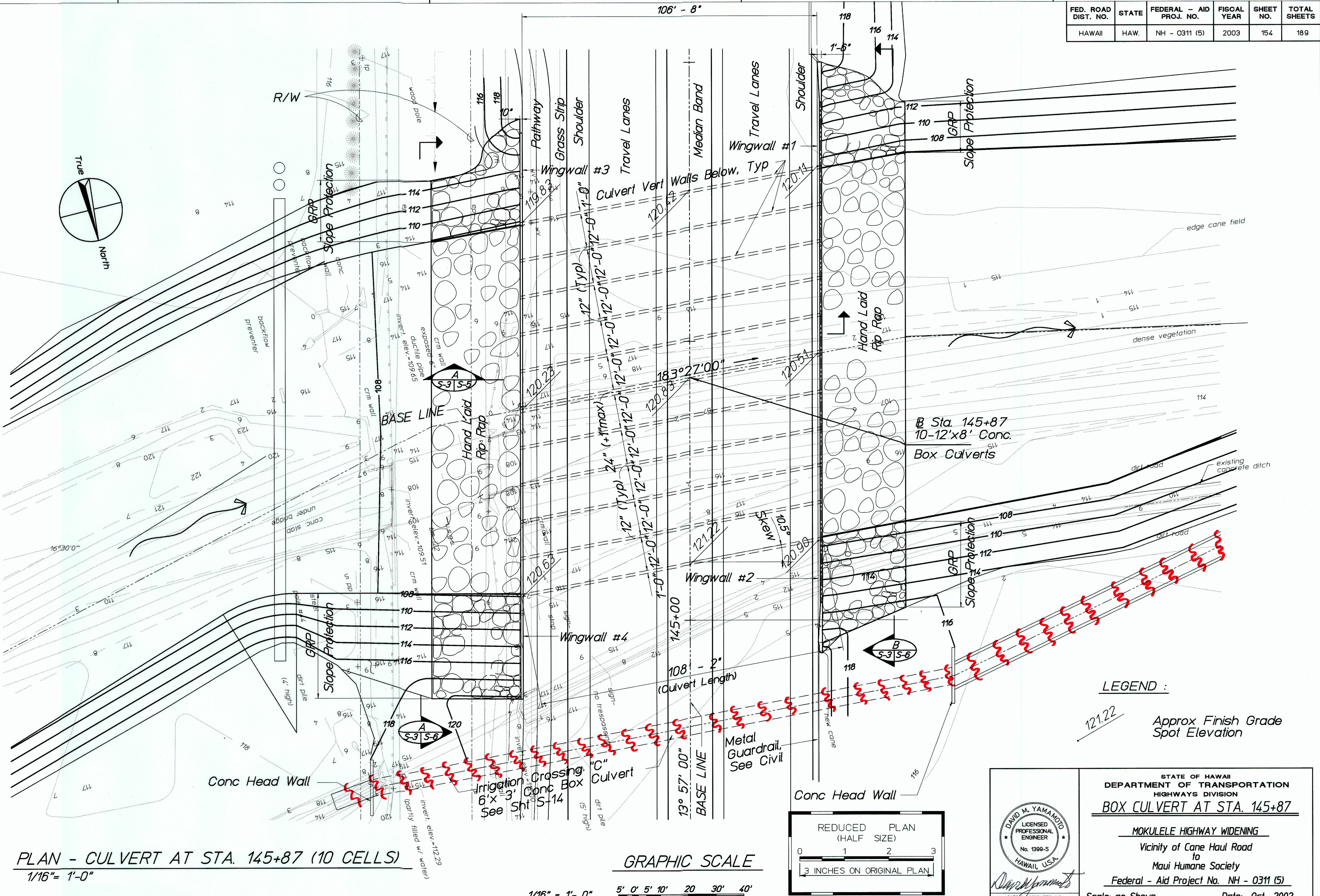


SATO & ASSOCIATES, INC.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

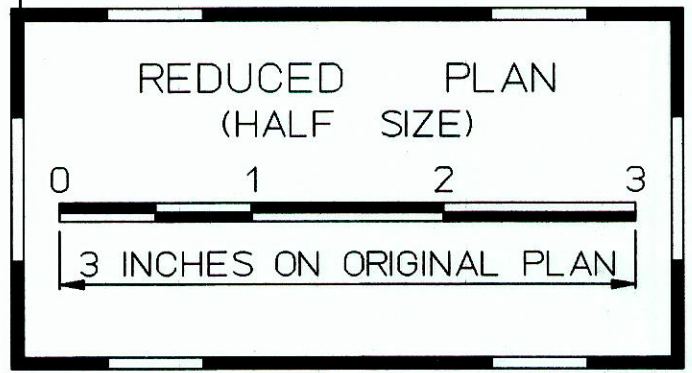
1/06/03	Revised Est. Qtys for Irrigation Culvert 'A' Extension
Date	Revision
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION IRRIGATION & BOX CULVERT KEY PLAN MOKULELE HIGHWAY WIDENING Vicinity of Cane Haul Road to Maui Humane Society Federal - Aid Project No. NH - 0311 (5) Scale: as Shown Date: Oct 2002 SHEET No. S-2 OF 14 SHEETS	

ADD. 153

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	
NOTE BOOK	QUANTITIES BY	
	CHECKED BY	



FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	154	189



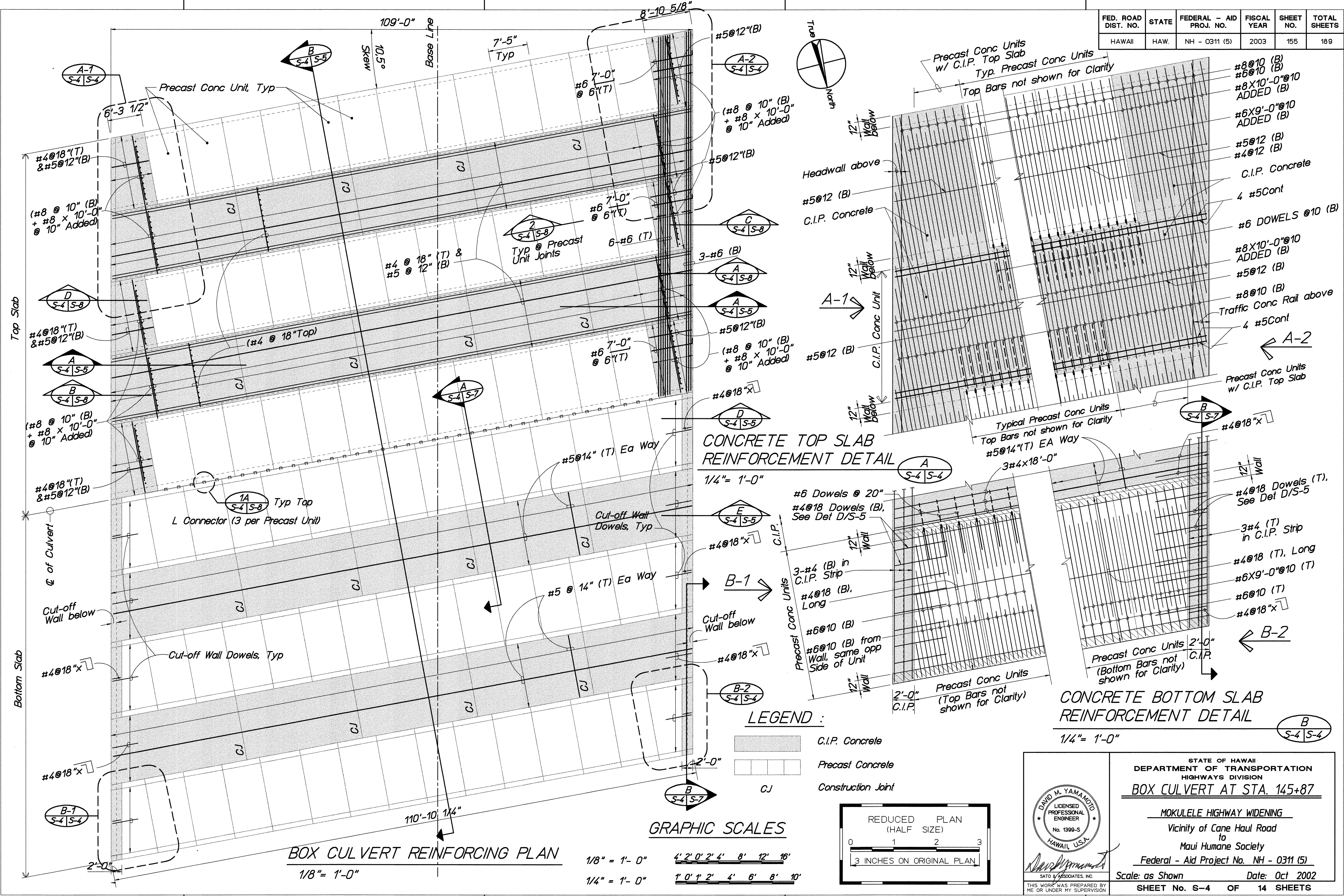
DAVID M. YAMAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 1399-S
HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT AT STA. 145+87
MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
to
Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)
Scale: as Shown Date: Oct 2002
SHEET No. S-3 OF 14 SHEETS

"AS-BUILT"

Precast Conc Unit, Typ

FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	155	189

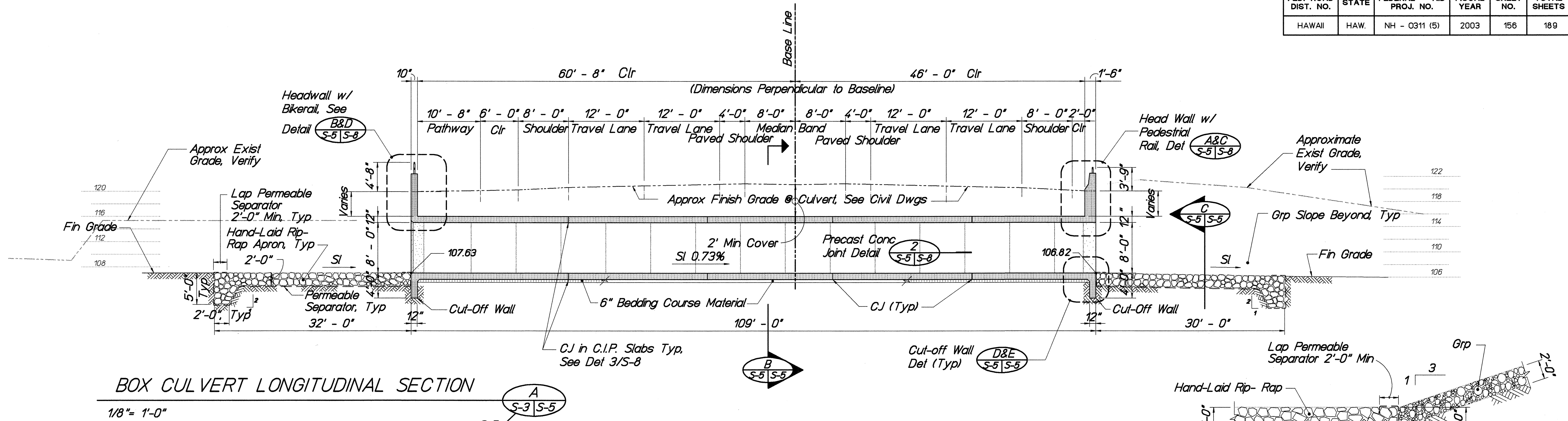


DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
TRACED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
NOTE BOOK	_____
No.	_____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT AT STA. 145+87
MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
to
Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)
Scale: as Shown Date: Oct 2002
SHEET No. S-4 OF 14 SHEETS

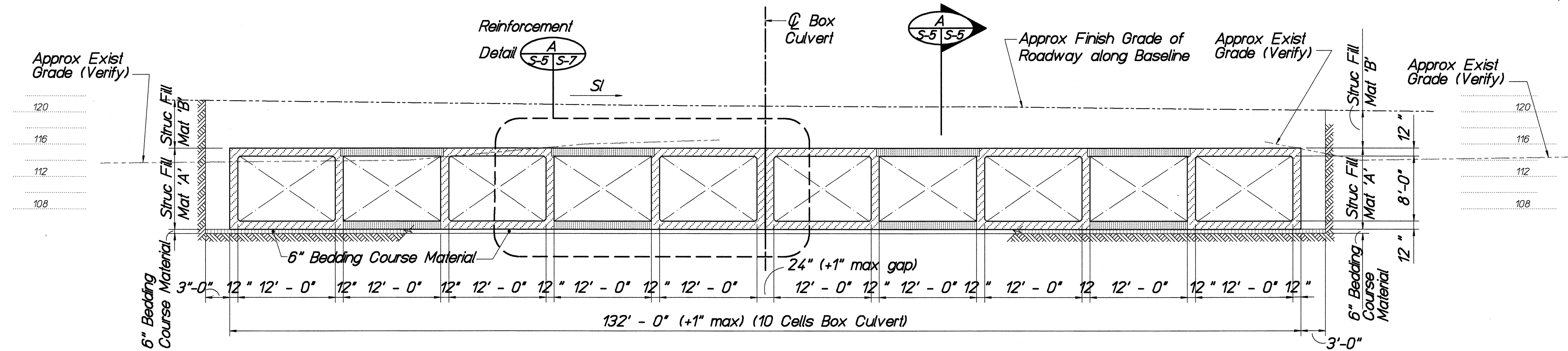
DAVID M. YAMAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 1399-S
HAWAII, U.S.A.
SATO & ASSOCIATES, INC.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	156	189



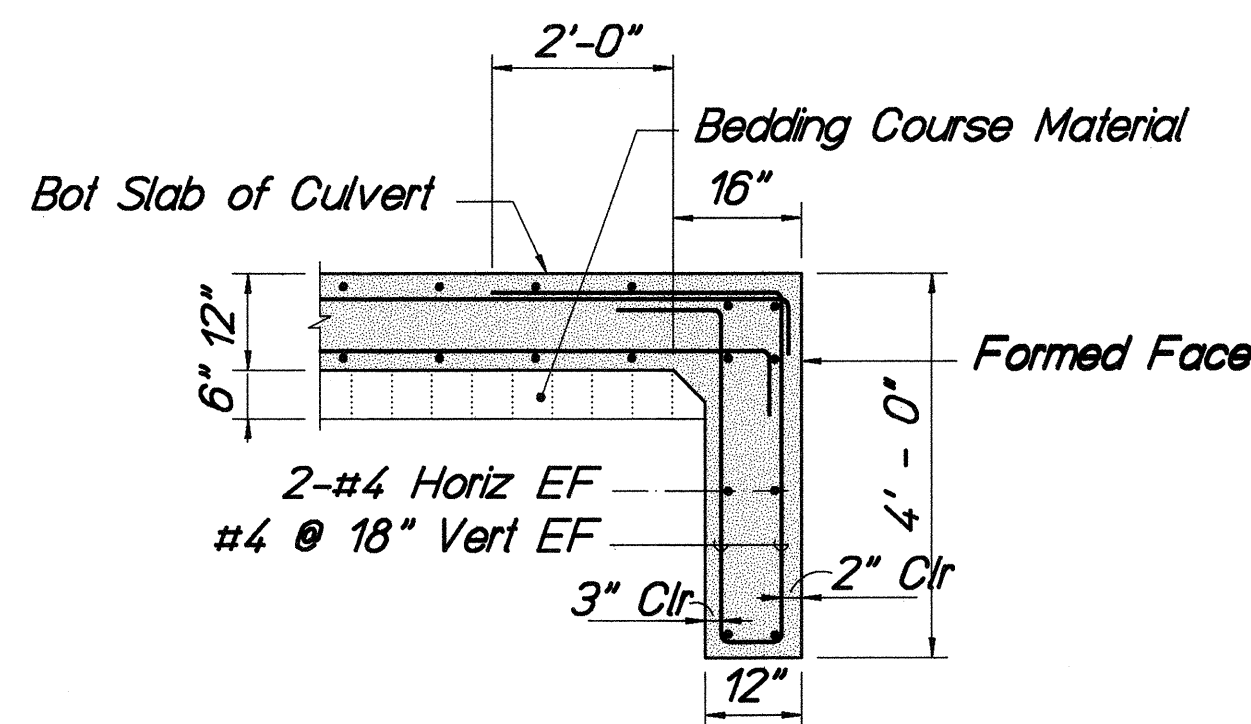
BOX CULVERT LONGITUDINAL SECTION

1/8" = 1'-0"



BOX CULVERT CROSS SECTION

1/8" = 1'-0"



CUT-OFF WALL @ CIP BOX CULVERT

1/2" = 1'-0"

CUT-OFF WALL @ PRECAST BOX CULVERT

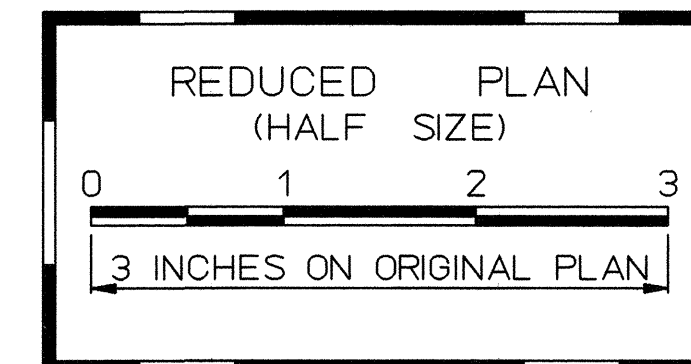
1/2" = 1'-0"

LEGEND:

Precast Concrete Unit

Poured in Place Concrete

Construction Joint



STONE SIZE (LBS)	PERCENT OF STONE SMALLER THAN
200	100
75	50
5	10

Note: Neither Width Nor Thickness of a Single Stone Shall be Less Than one-Third its Length.

SECTION

3/16" = 1'-0"

GRAPHIC SCALES

1/8" = 1'-0"

3/16" = 1'-0"

1/2" = 1'-0"

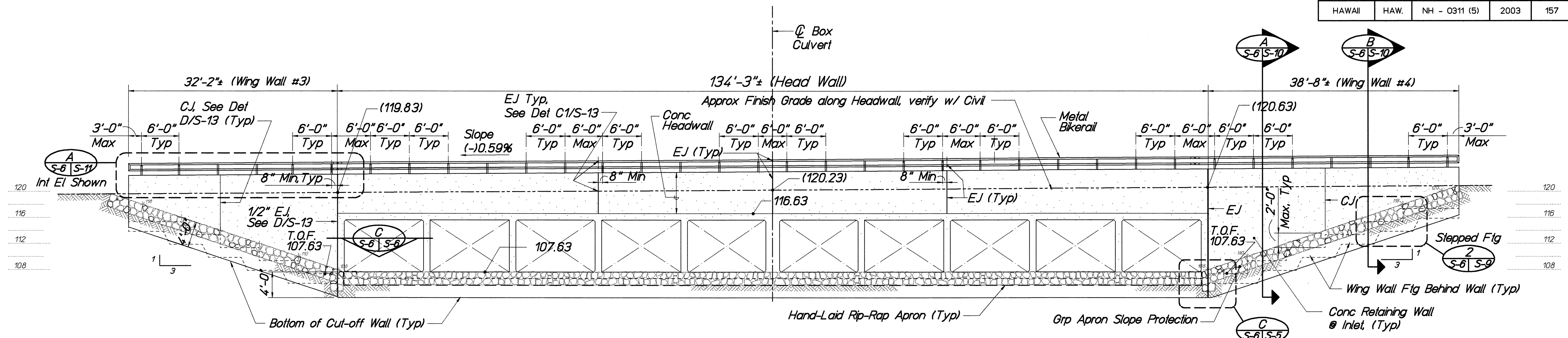
4' 2' 0' 2' 4' 8' 12' 16'

2' 1' 0' 1' 2' 4' 6' 8' 10' 12'

2' 1' 0' 1' 2' 4' 6'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT AT STA. 145+87
MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
to
Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)
Scale: as Shown Date: Oct 2002
SHEET No. S-5 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	157	189



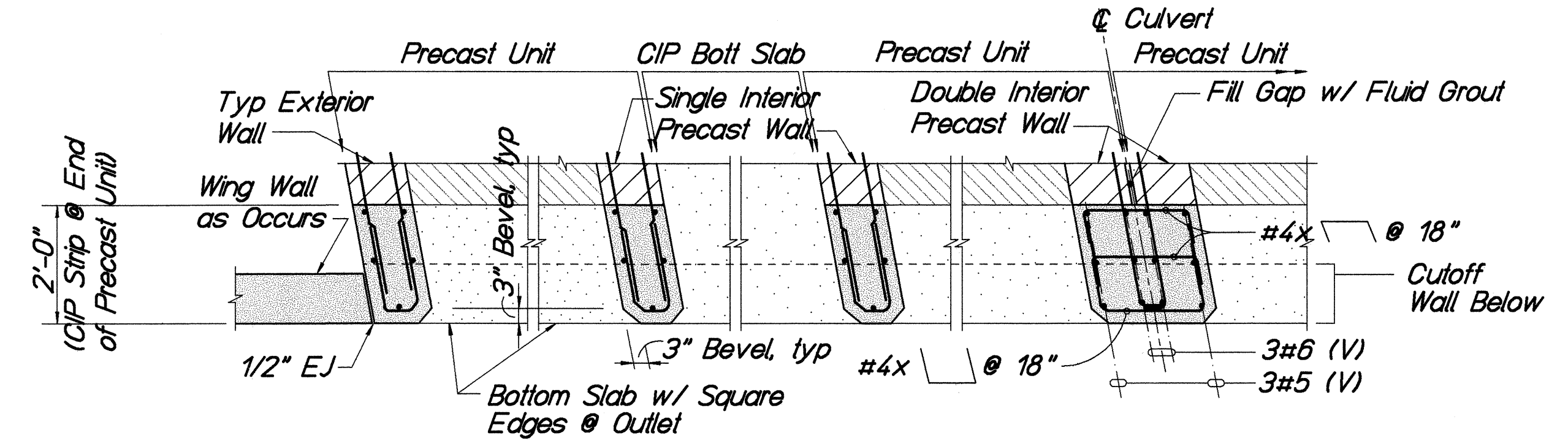
BOX CULVERT @ INLET

1/8" = 1'-0"

A
S-3 S-6

LEGEND :

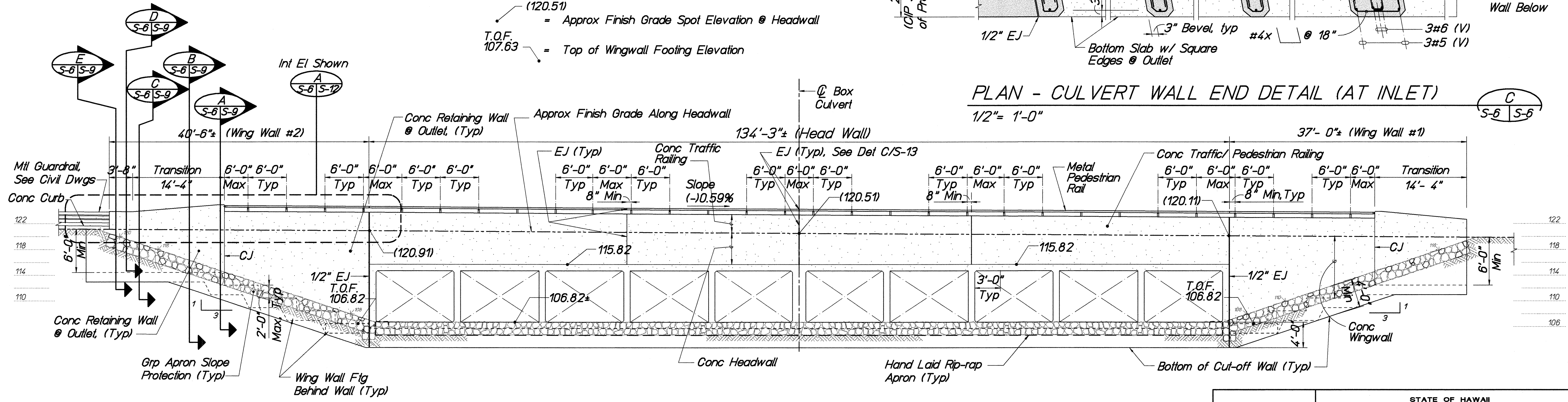
- EJ = Expansion Joint. See Sheet S-13 for Details
- CJ = Construction Joint. See Sheet S-13 for Details
- (120.51) = Approx Finish Grade Spot Elevation @ Headwall
- T.O.F. 107.63 = Top of Wingwall Footing Elevation



PLAN - CULVERT WALL END DETAIL (AT INLET)

1/2" = 1'-0"

C
S-6 S-6

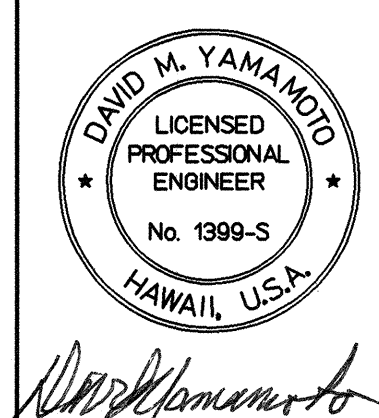
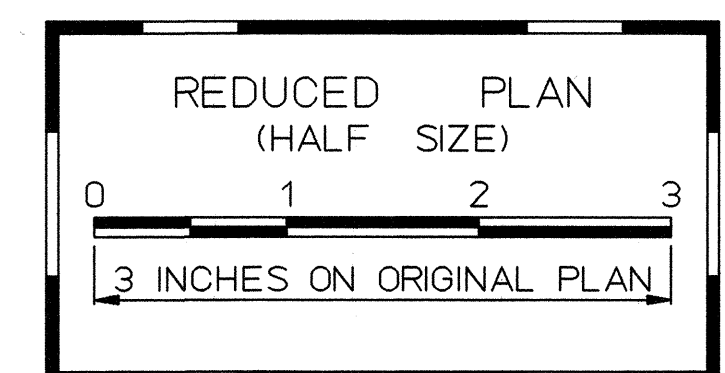
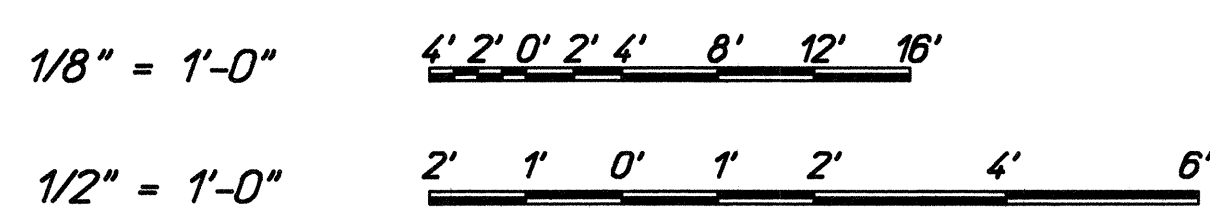


BOX CULVERT @ OUTLET

1/8" = 1'-0"

B
S-3 S-6

GRAPHIC SCALES



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BOX CULVERT AT STA. 145+87

MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
to
Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)

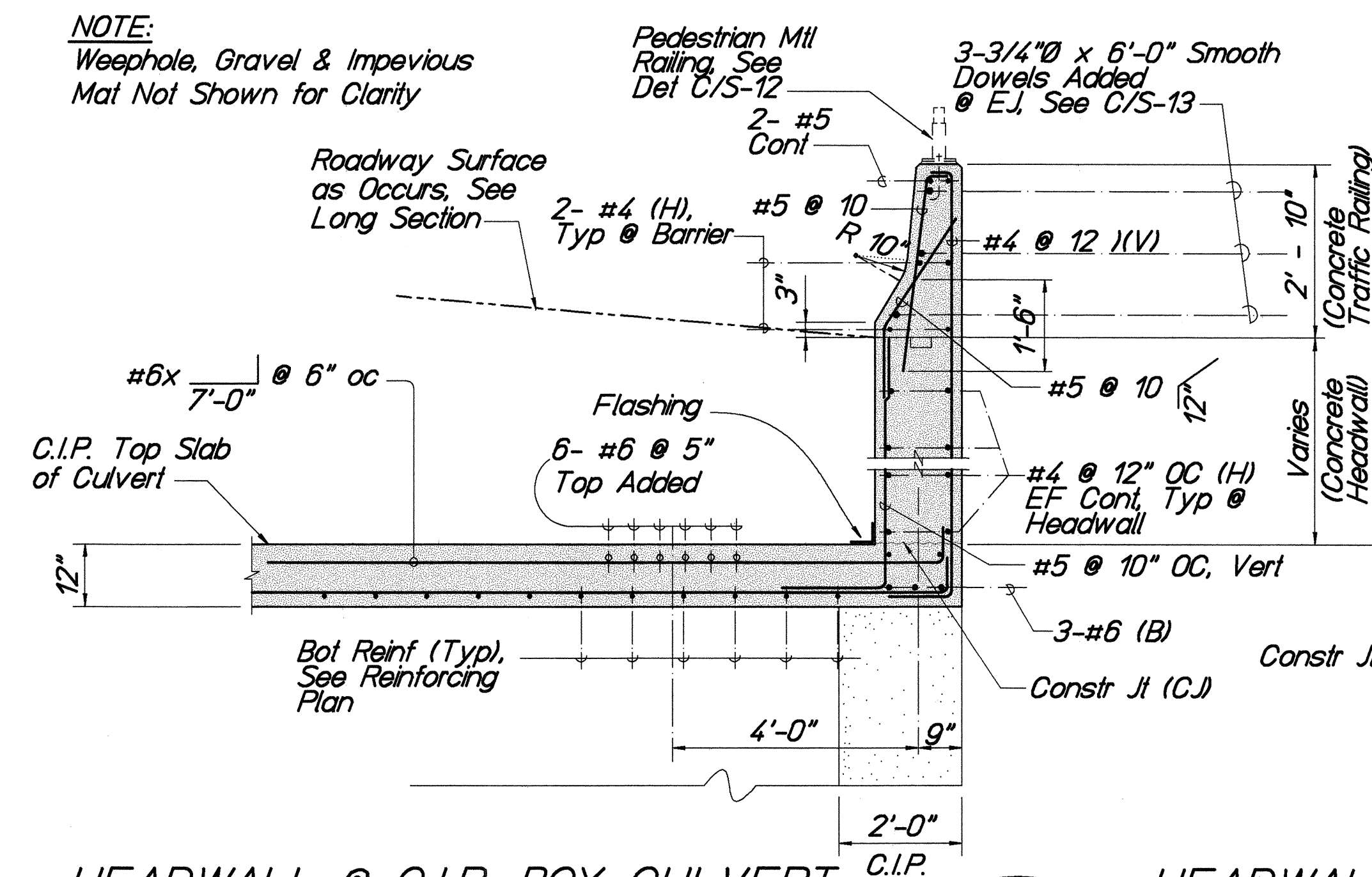
Scale: as Shown Date: Oct 2002

SHEET No. S-6 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	159	169

NOTE:

Weephole, Gravel & Impevious Mat Not Shown for Clarity

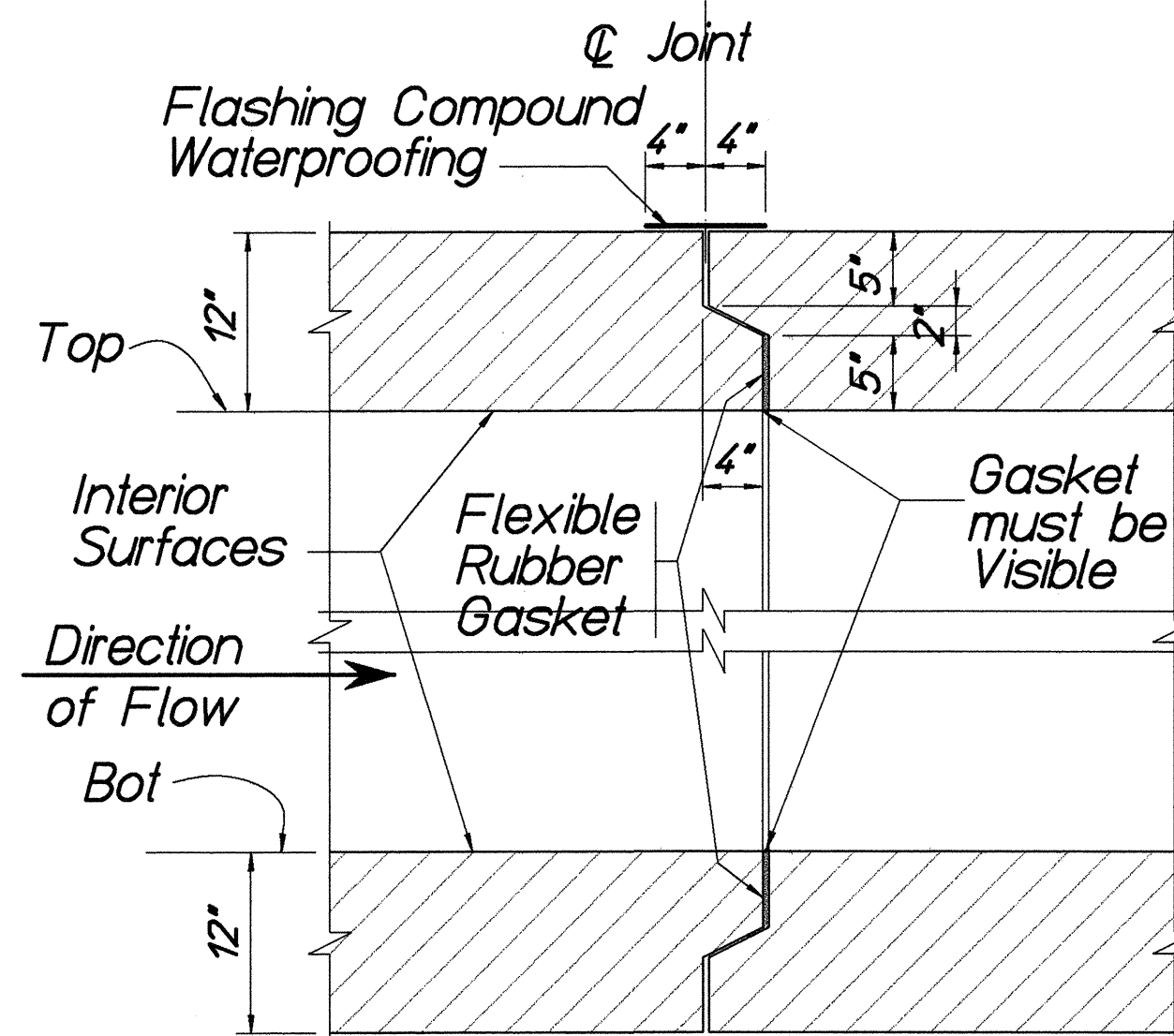
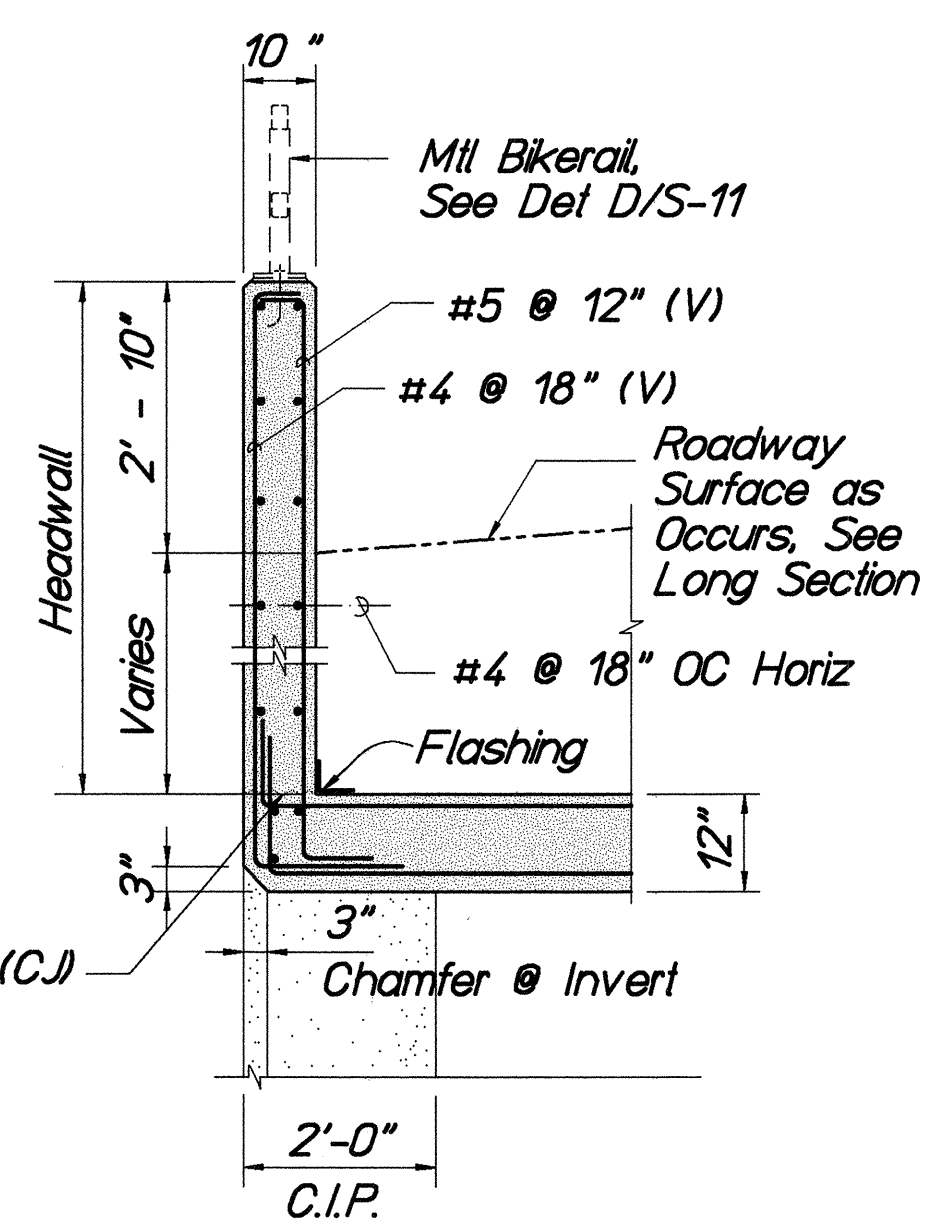


HEADWALL @ C.I.P. BOX CULVERT

1/2" = 1'-0"

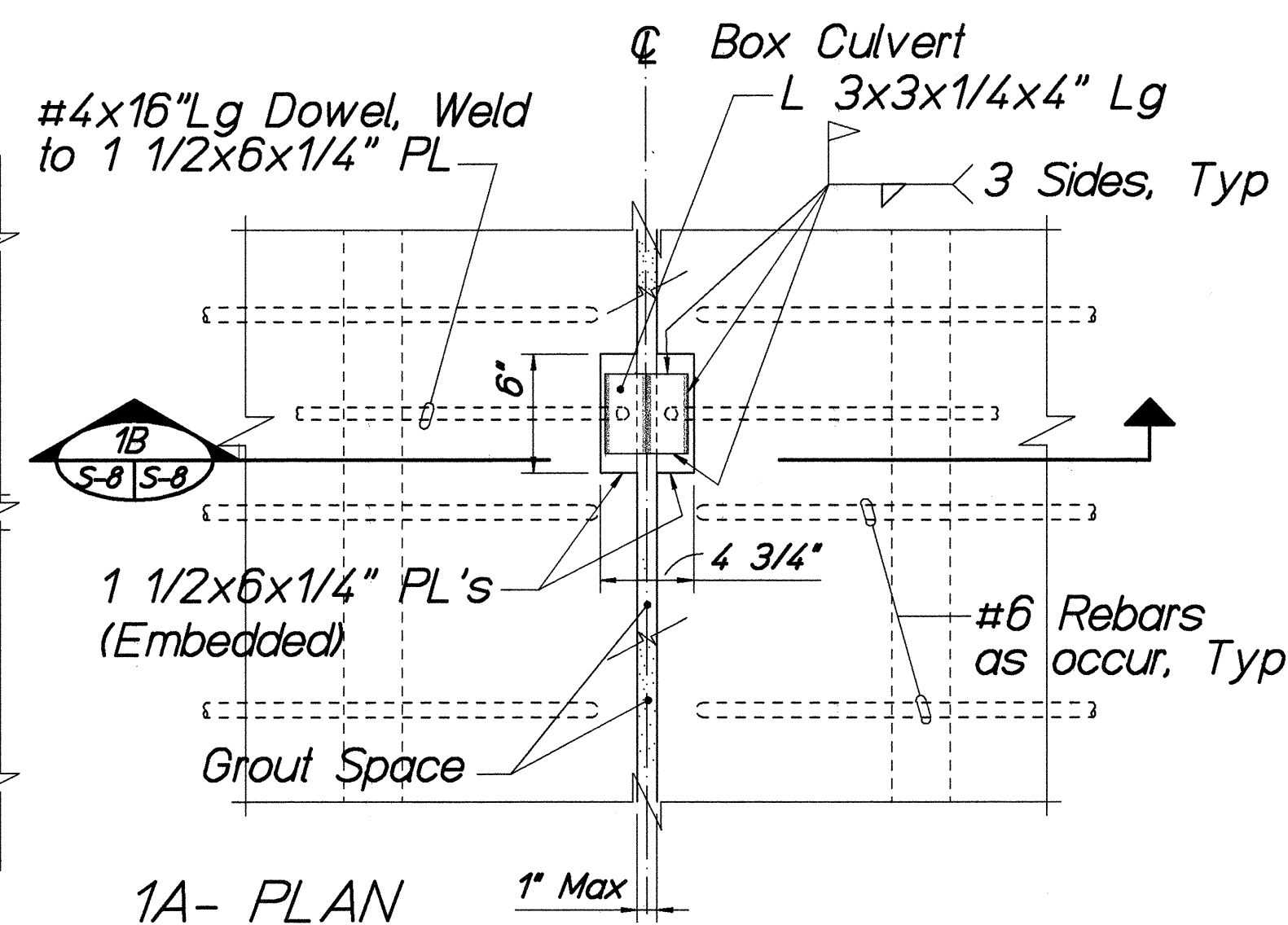
HEADWALL @ C.I.P. BOX CULVERT

1/2" = 1'-0"



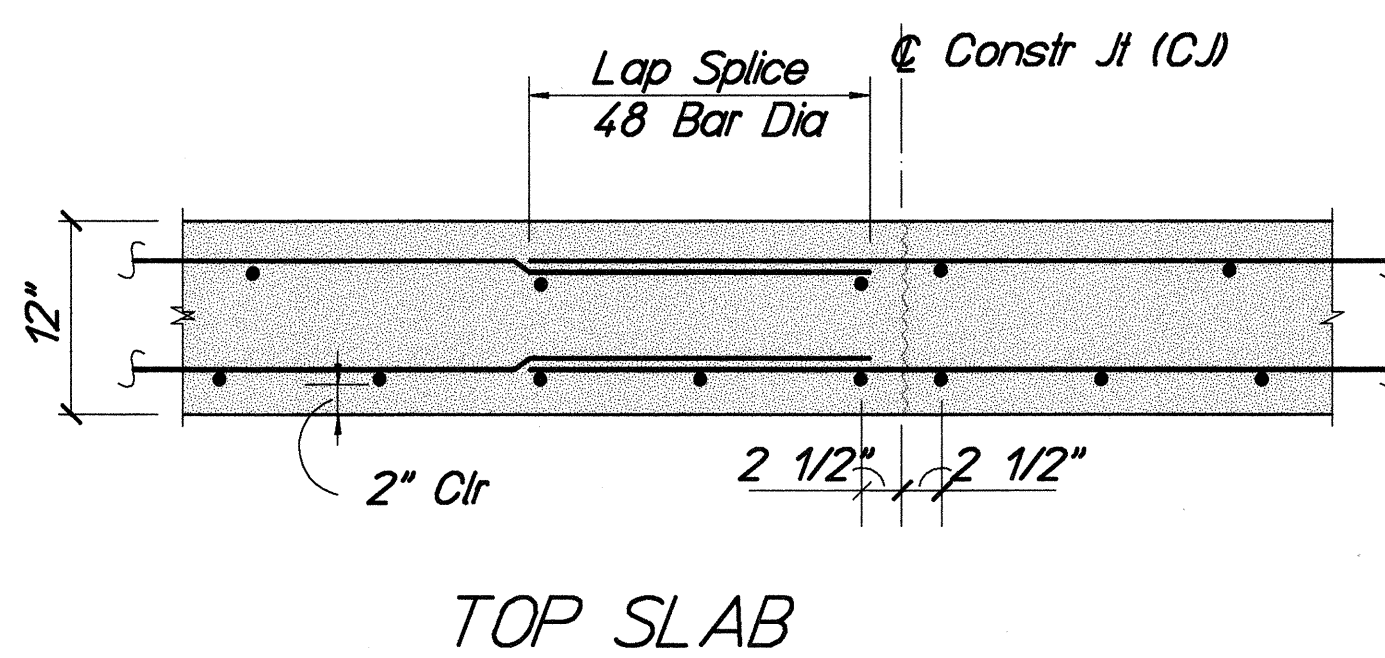
DETAIL

1" = 1'-0"

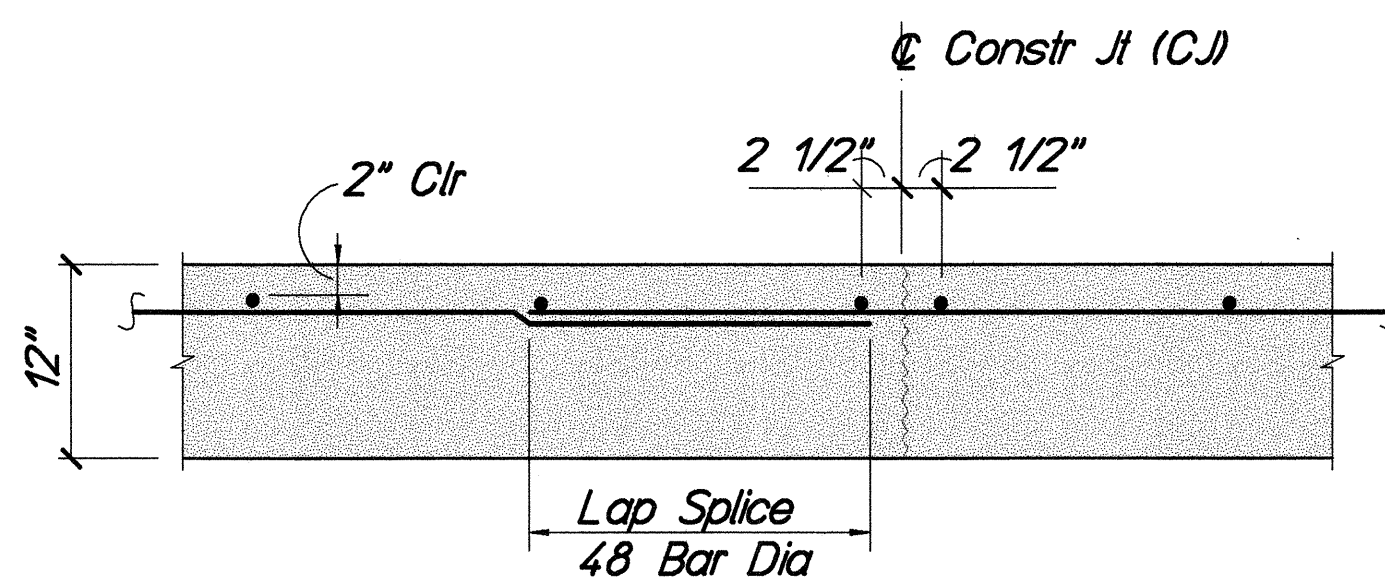


1A- PLAN

1" = 1'-0"



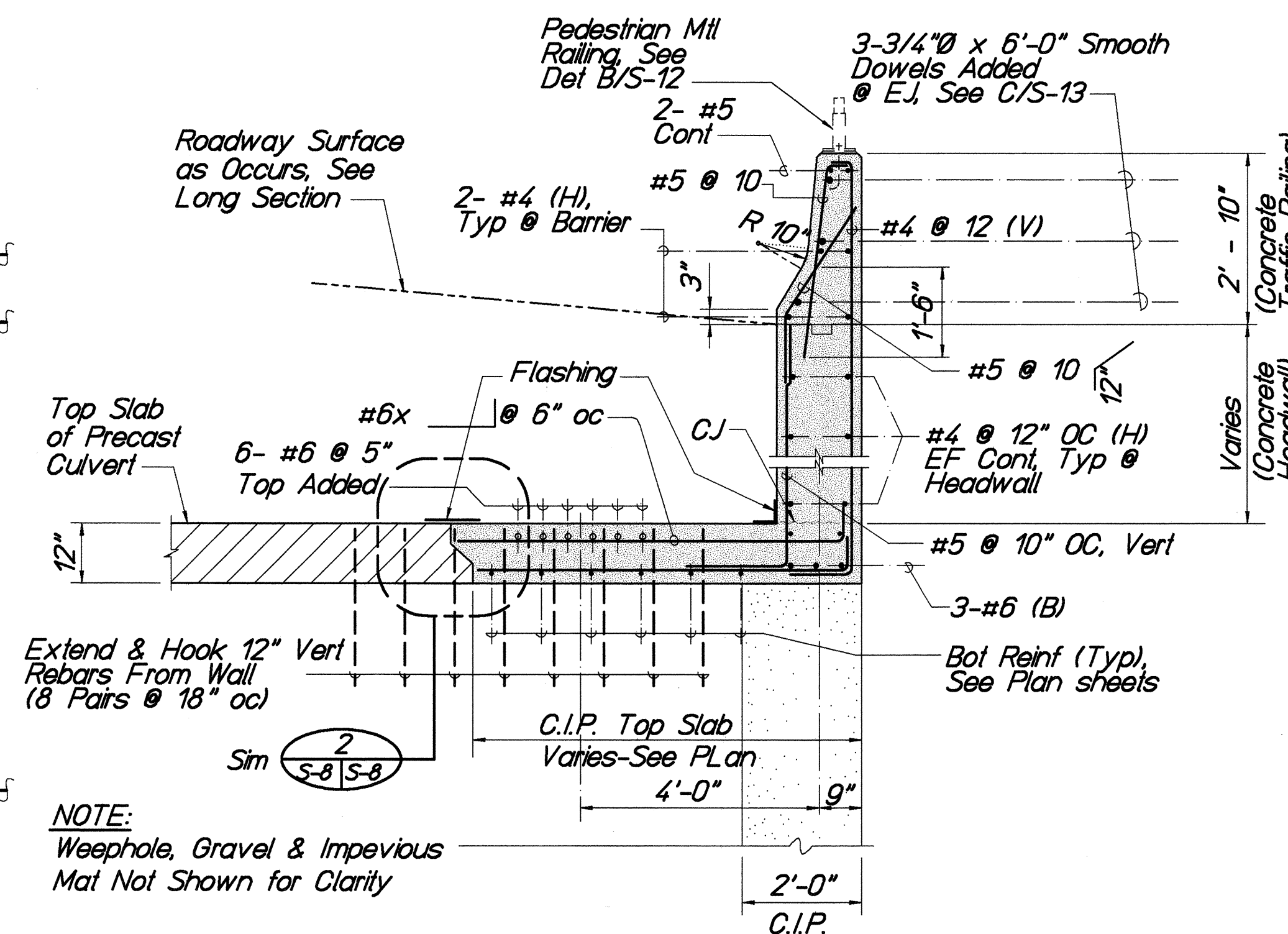
TOP SLAB



BOTTOM SLAB

C.I.P. SLAB CONSTRUCTION JOINT DETAILS

1" = 1'-0"



HEADWALL @ PRECAST BOX CULVERT

1/2" = 1'-0"

(For Typical Top Reinforcement, See Cross-Section Near Headwall)

HEADWALL @ PRECAST BOX CULVERT

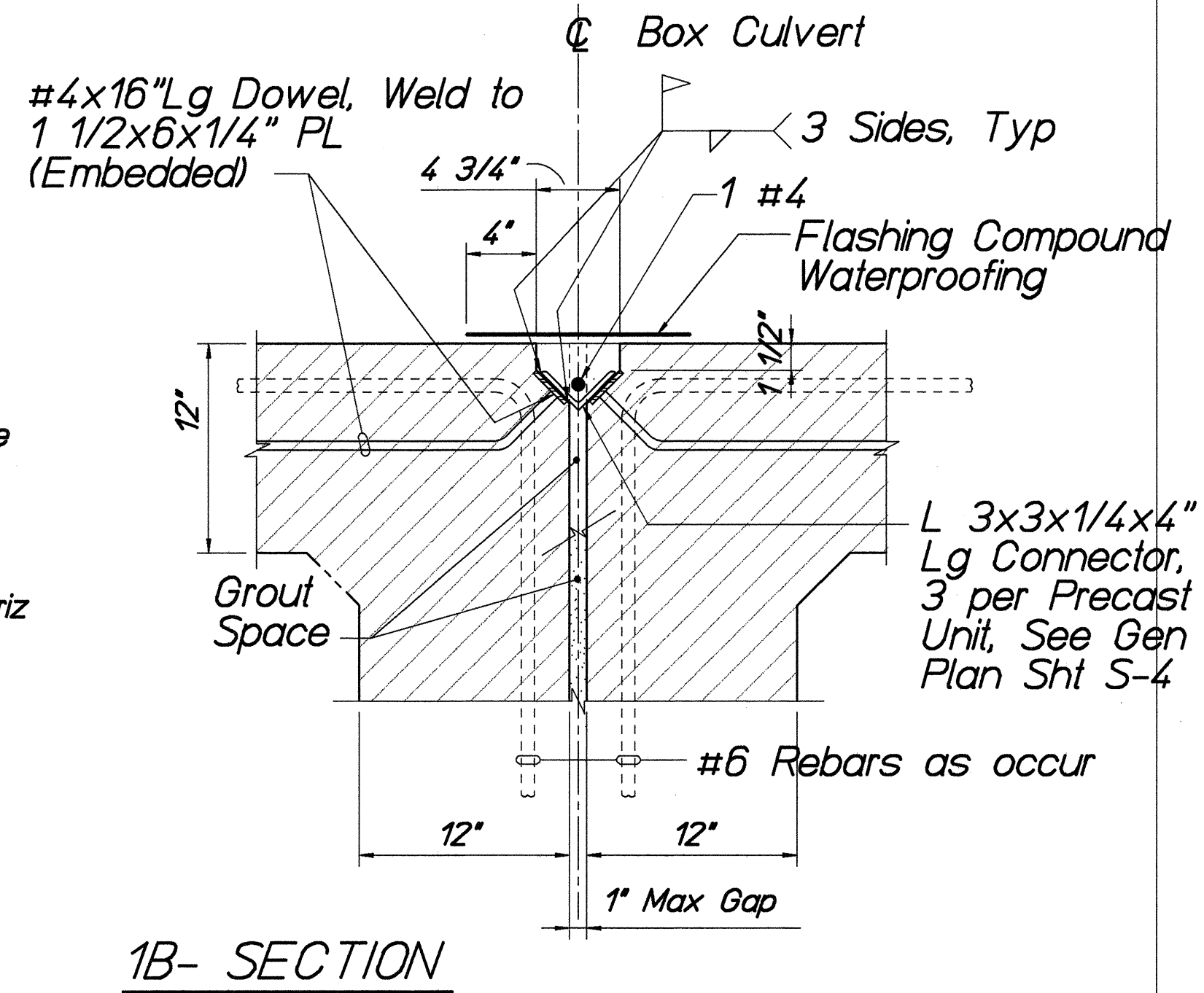
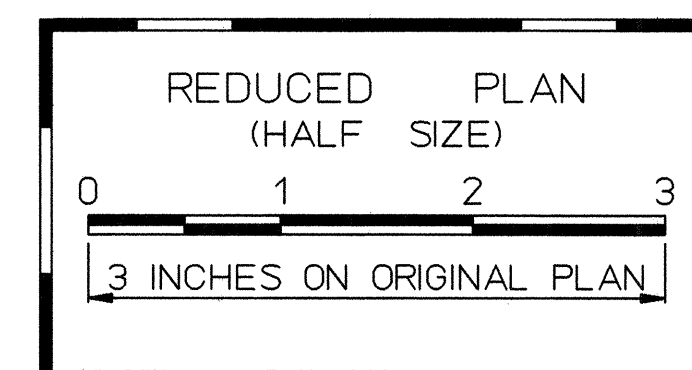
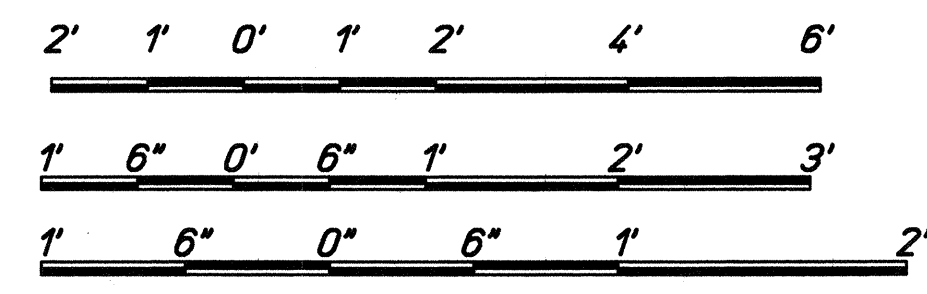
1/2" = 1'-0"

GRAPHIC SCALES

1/2" = 1'-0"

1" = 1'-0"

1 1/2" = 1'-0"



1B- SECTION

DETAILS

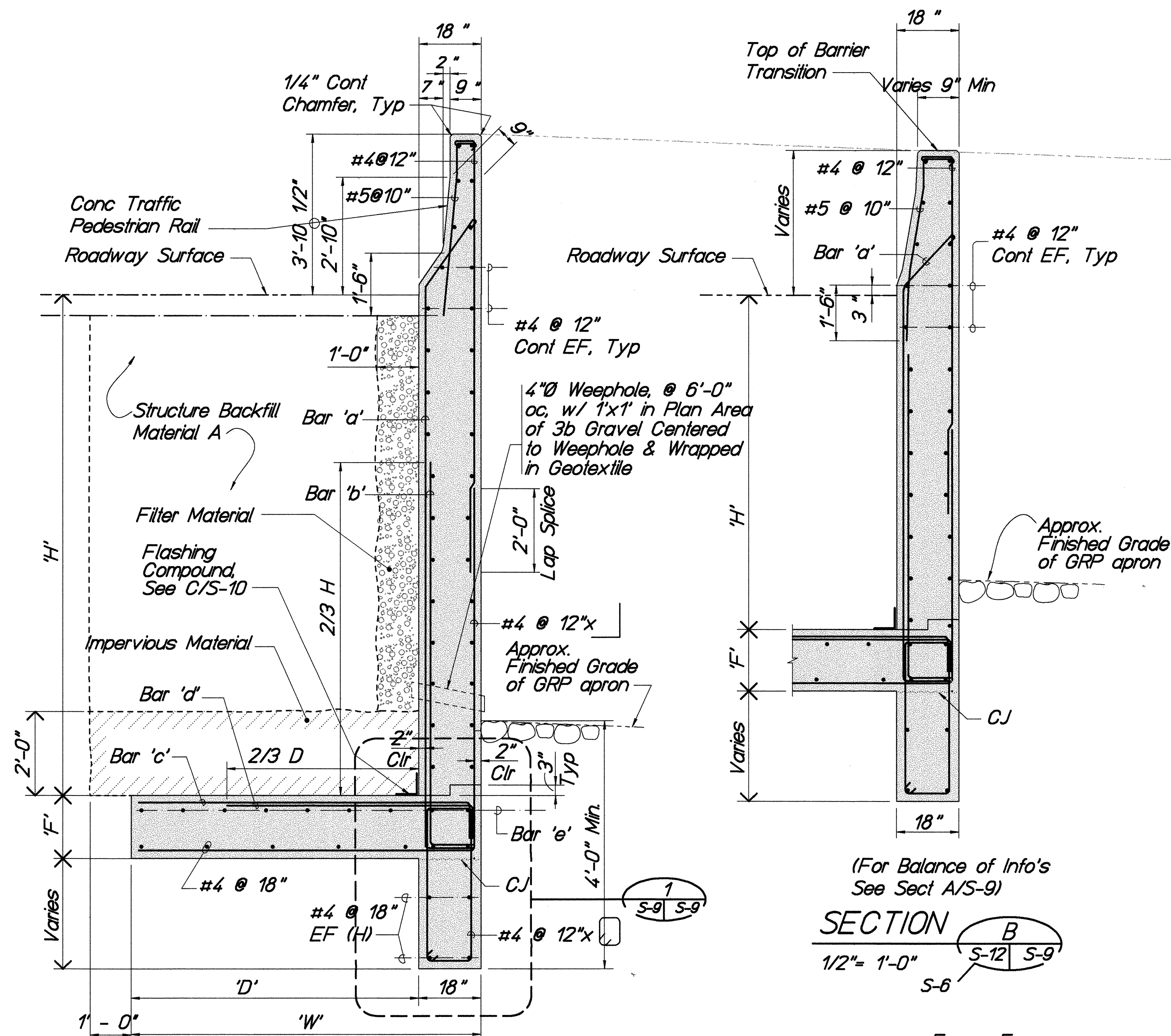
1 1/2" = 1'-0"

S-4, S-8

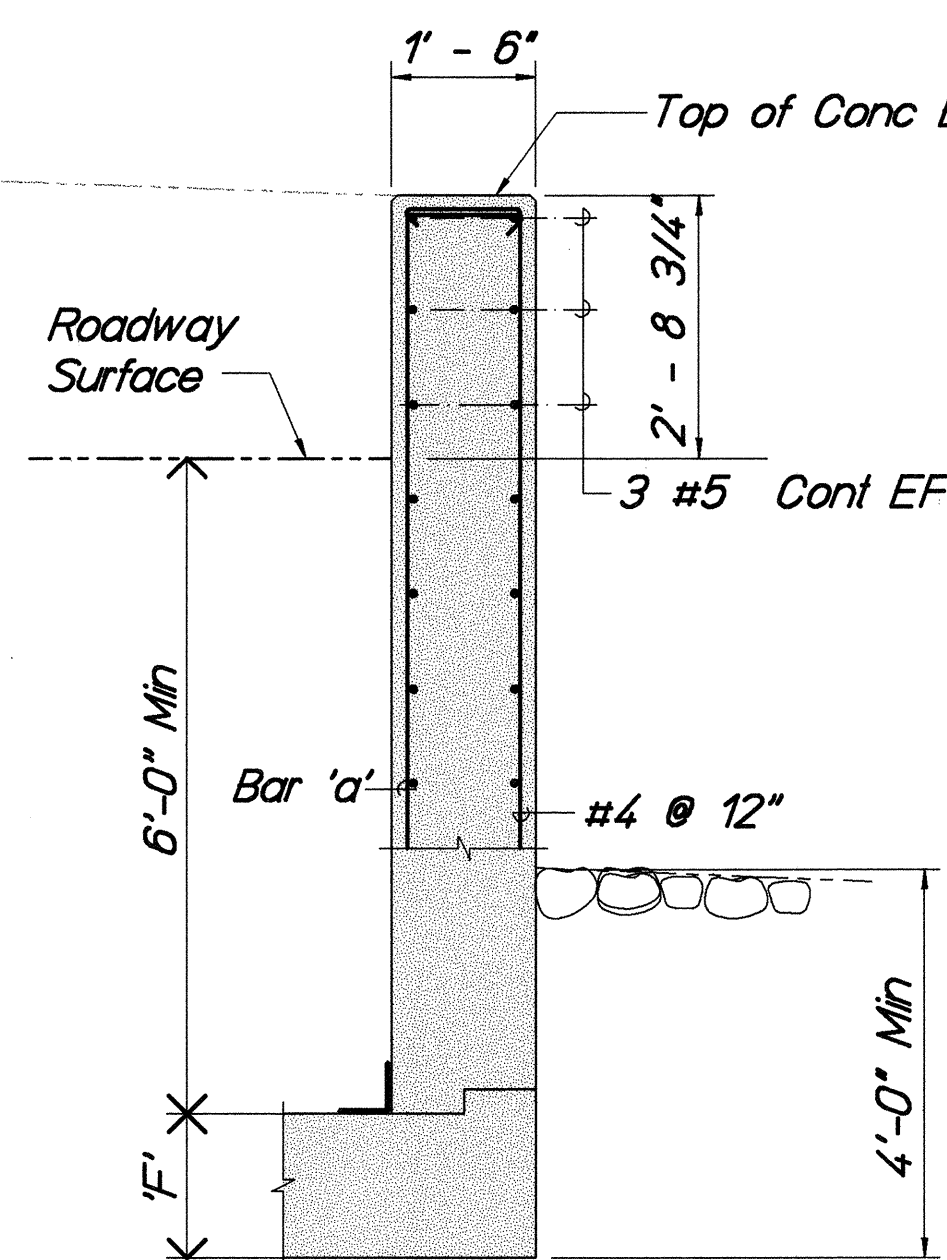
DAVID M. YAMAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 1399-S
HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT AT STA. 145+87
MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
to
Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)
Scale: as Shown Date: Oct 2002
SHEET No. S-8 OF 14 SHEETS

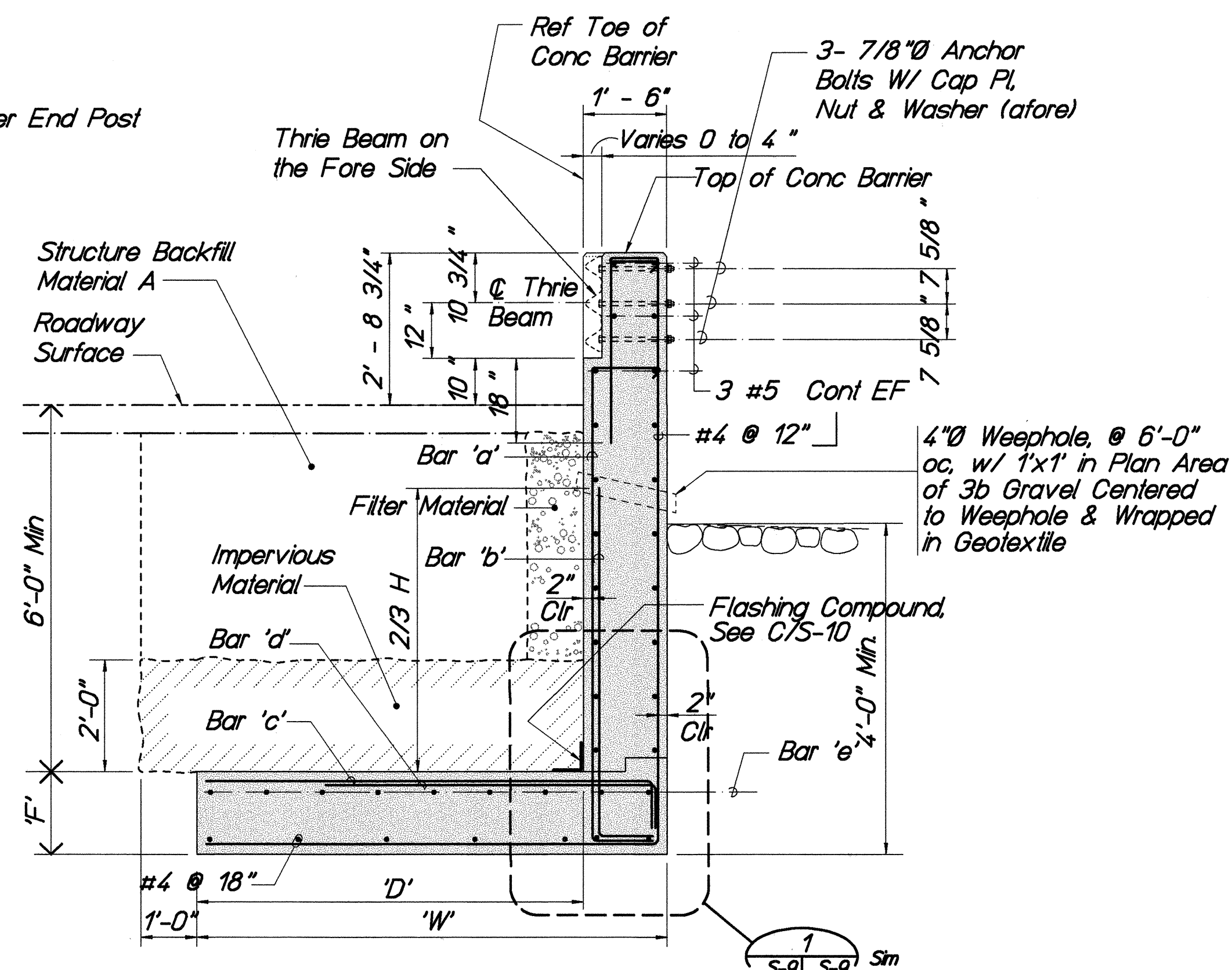
FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	160	189



(For Balance of Info's See Sect A/S-9)
SECTION B
1/2" = 1'-0"
S-6



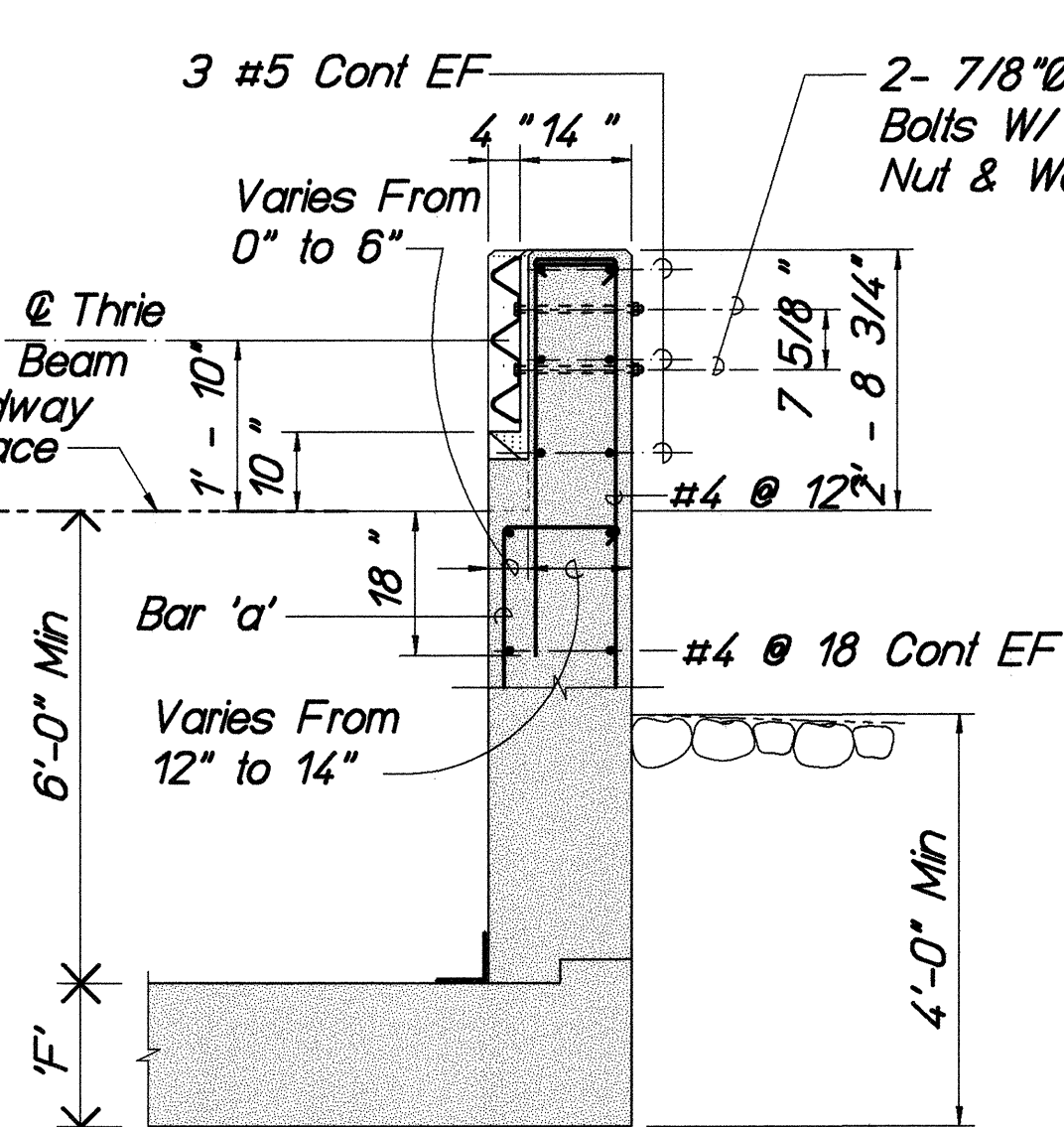
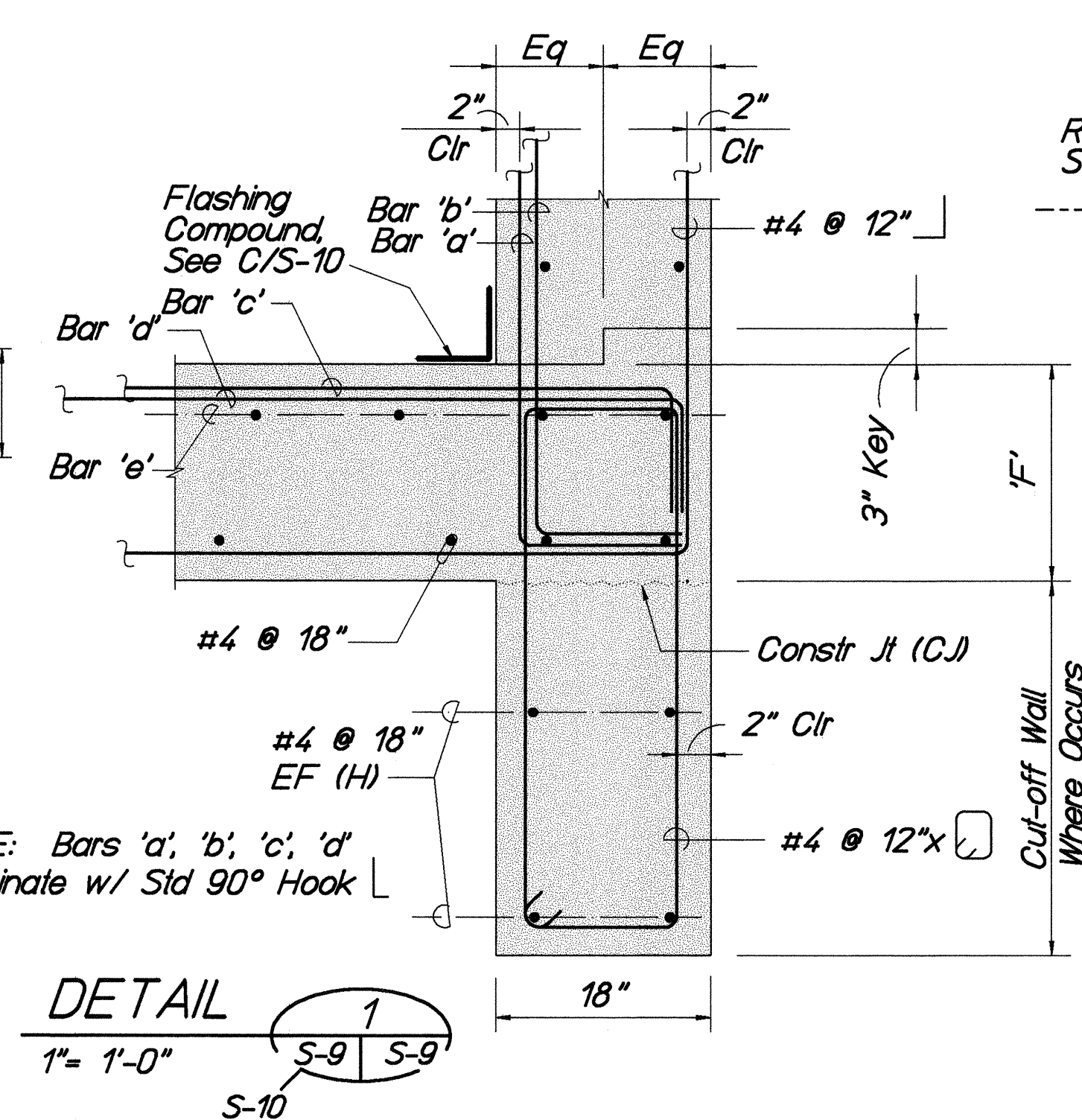
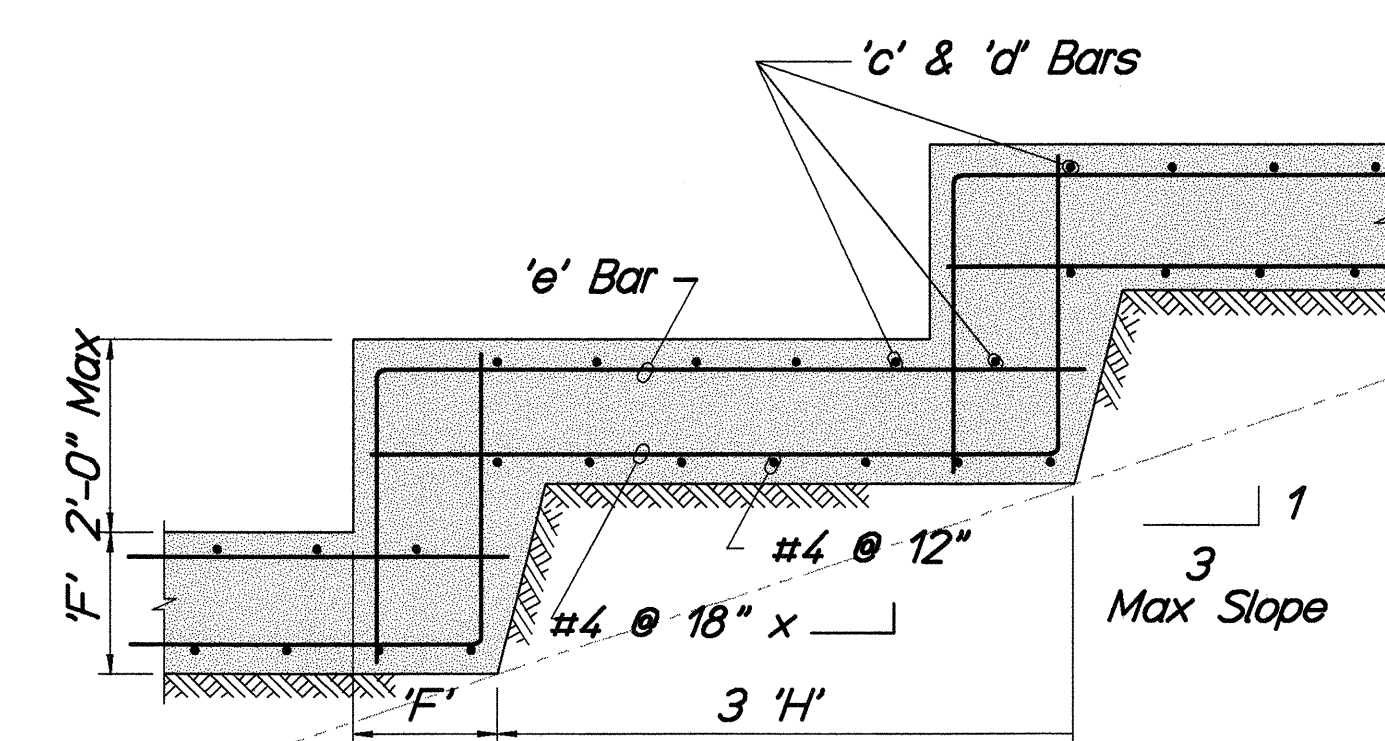
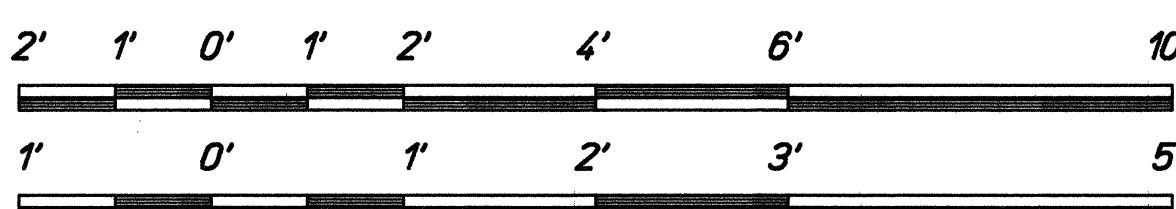
(For Balance of Info's See Sect D/S-9)
SECTION D
1/2" = 1'-0"
S-6



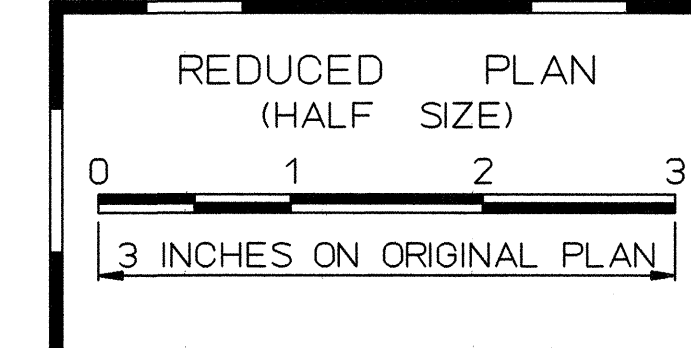
WING WALLS #1 & #2 SCHEDULE

Design	6'	8'	10'	12'	14'
'F'	1'- 2"	1'- 2"	1'- 4"	1'- 4"	1'- 6"
'W'	12'- 6"	12'- 6"	12'- 6"	12'- 6"	15'- 6"
'a' Bars	#5 @ 10	#5 @ 10	#5 @ 10	#6 @ 10	#6 @ 10
'b' Bars	#5 @ 20	#6 @ 20	#6 @ 10	#6 @ 10	#7 @ 10
'c' Bars	#6 @ 10	#7 @ 10	#7 @ 10	#8 @ 10	#8 @ 10
'd' Bars	#6 @ 10	#7 @ 10	#7 @ 10	#8 @ 10	#8 @ 10
'e' Bars	12 #5	12 #5	14 #5	14 #5	16 #5

GRAPHIC SCALES

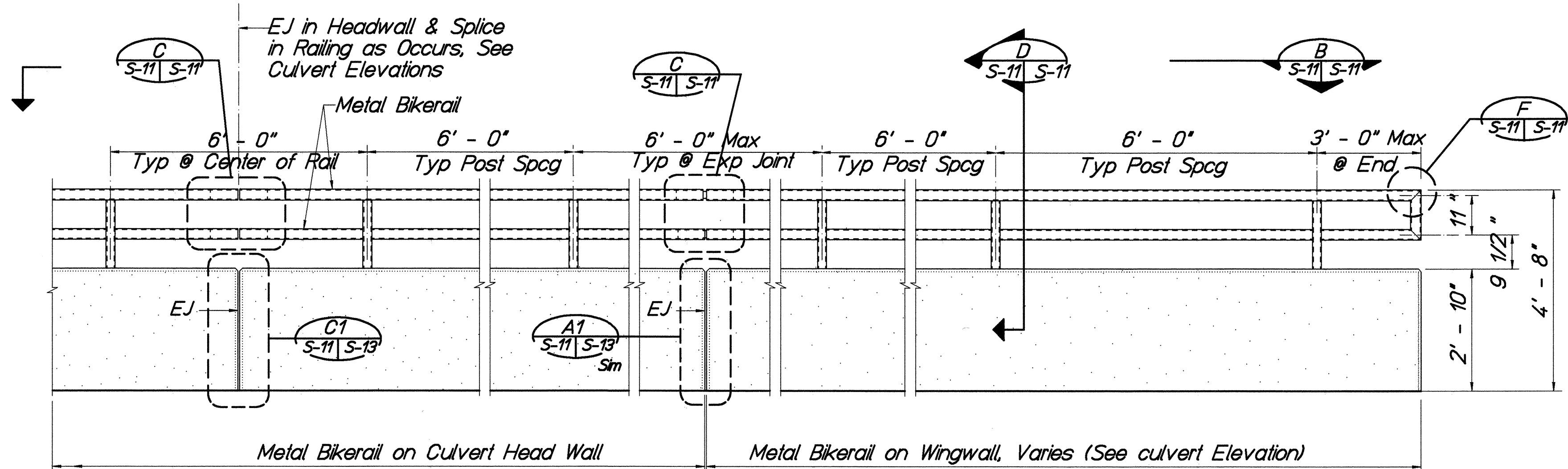


(For Balance of Info's See Sect D/S-9)
SECTION F
1/2" = 1'-0"
S-6



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT AT STA. 145+87
MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
to
Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)
Scale: as Shown Date: Oct 2002
SHEET No. S-9 OF 14 SHEETS

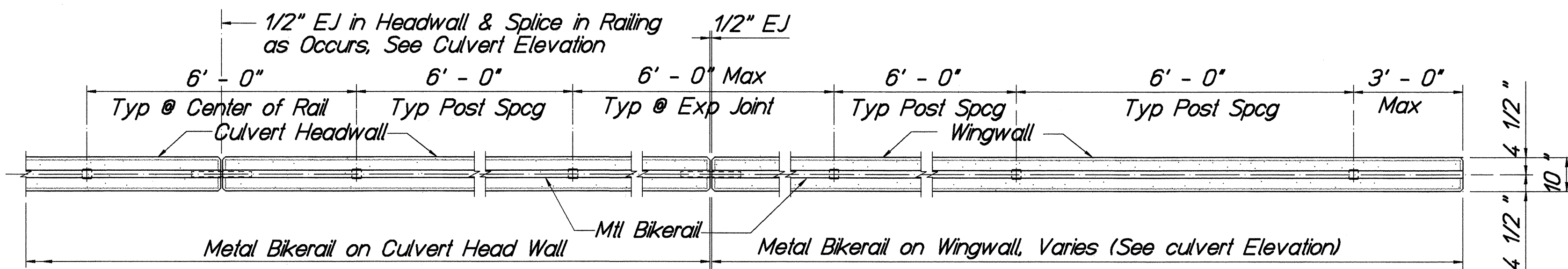
FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	162	189



BIKERAIL - ELEVATION

1/2" = 1'-0"

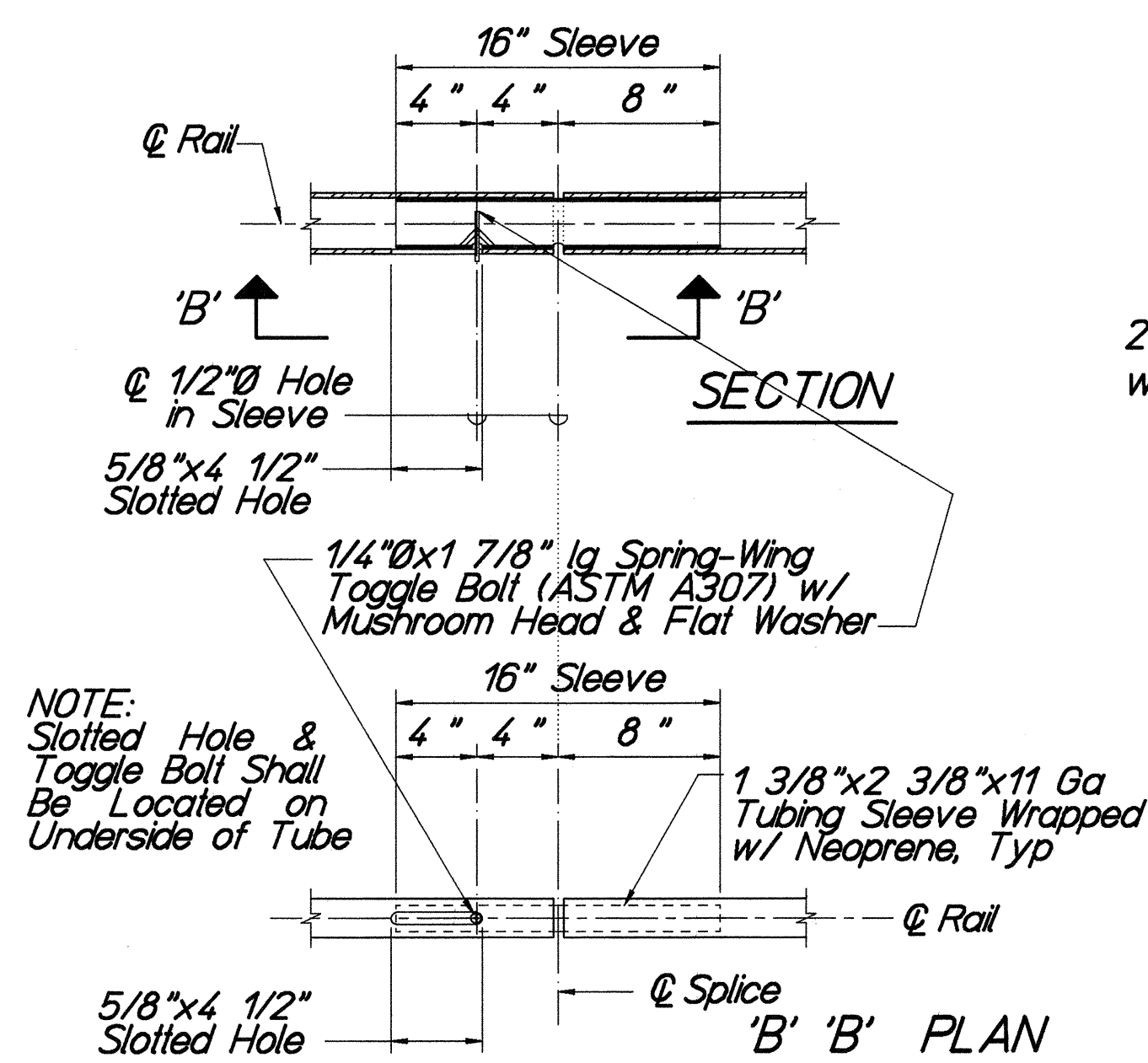
A
S-6 S-11



BIKERAIL - TOP VIEW

1/2" = 1'-0"

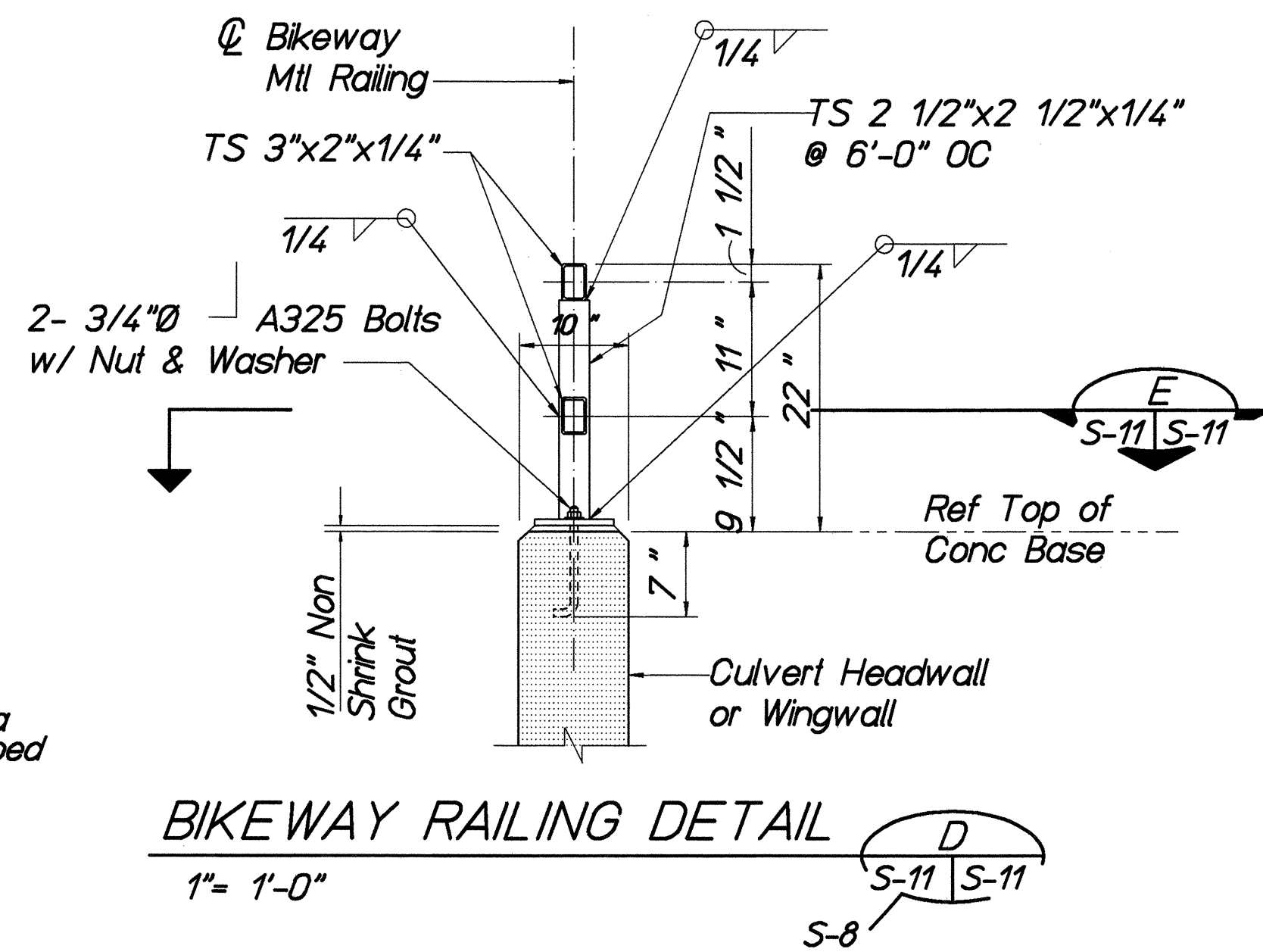
B
S-11 S-11



TYPICAL TUBE SPLICE DETAILS

1 1/2" = 1'-0"

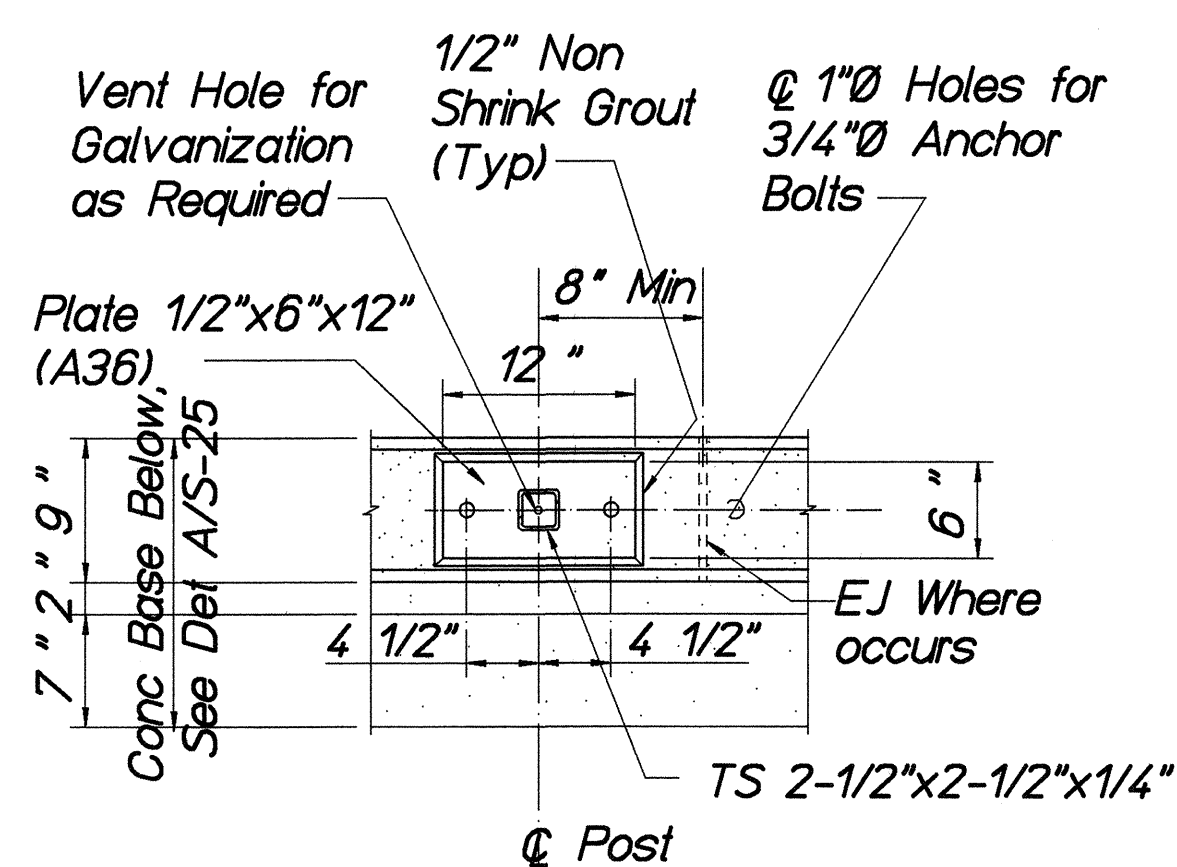
C
S-12 S-11 S-11



BIKEWAY RAILING DETAIL

1" = 1'-0"

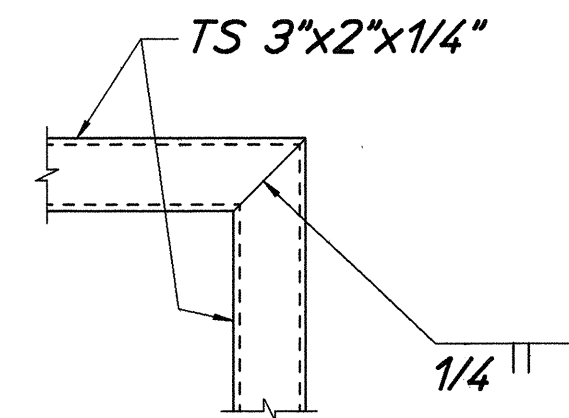
D
S-11 S-11
S-8



ANCHOR PLATE FOR BIKERAIL

1" = 1'-0"

E
S-11 S-11

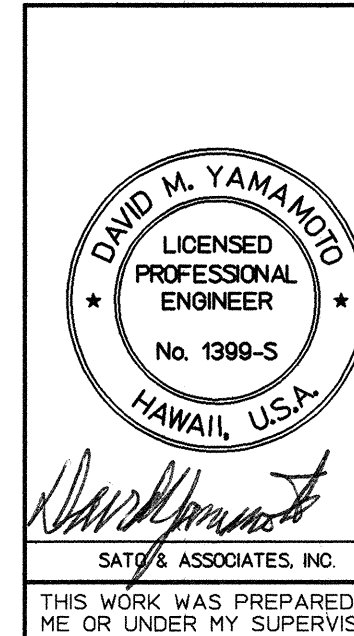
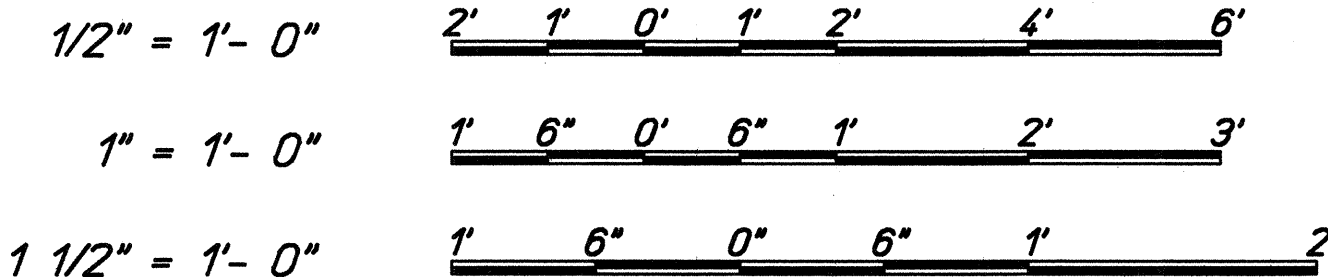


TYPICAL TUBE CONNECTION DETAIL

1 1/2" = 1'-0"

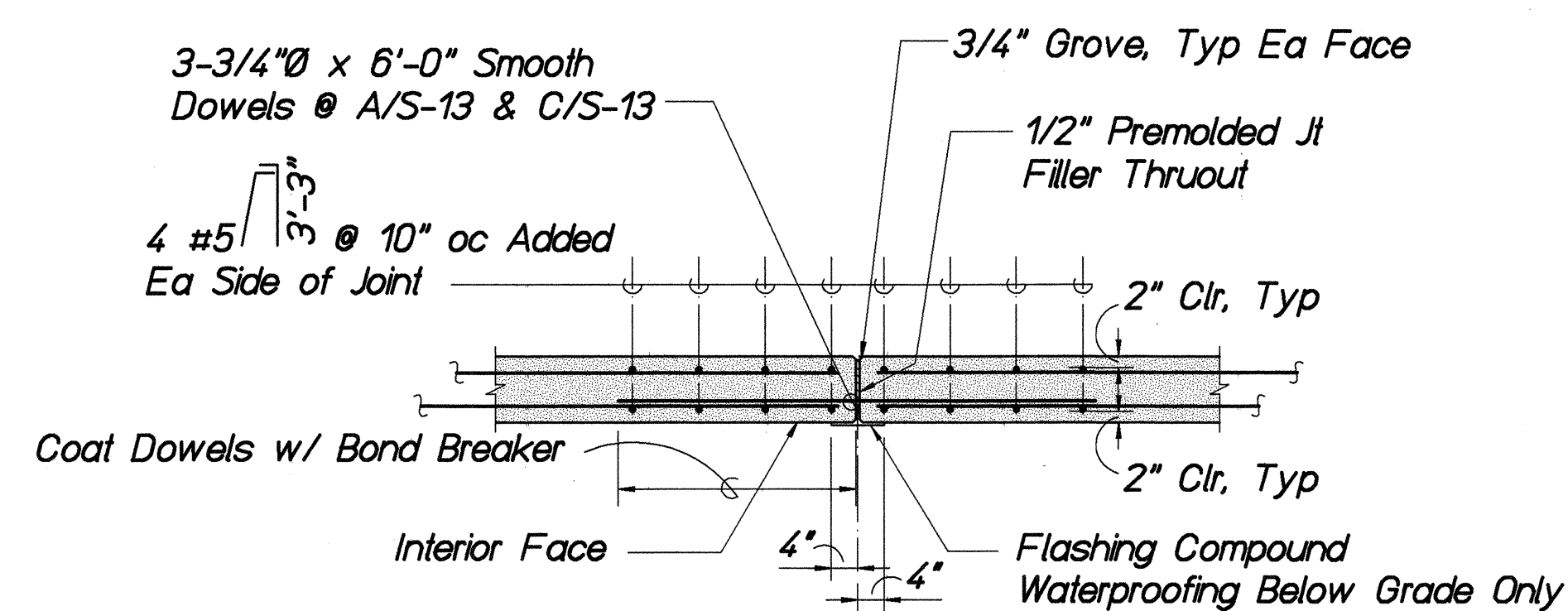
F
S-11 S-11

GRAPHIC SCALES



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT AT STA. 145+87
MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
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Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)
Scale: as Shown Date: Oct 2002
SHEET No. S-11 OF 14 SHEETS

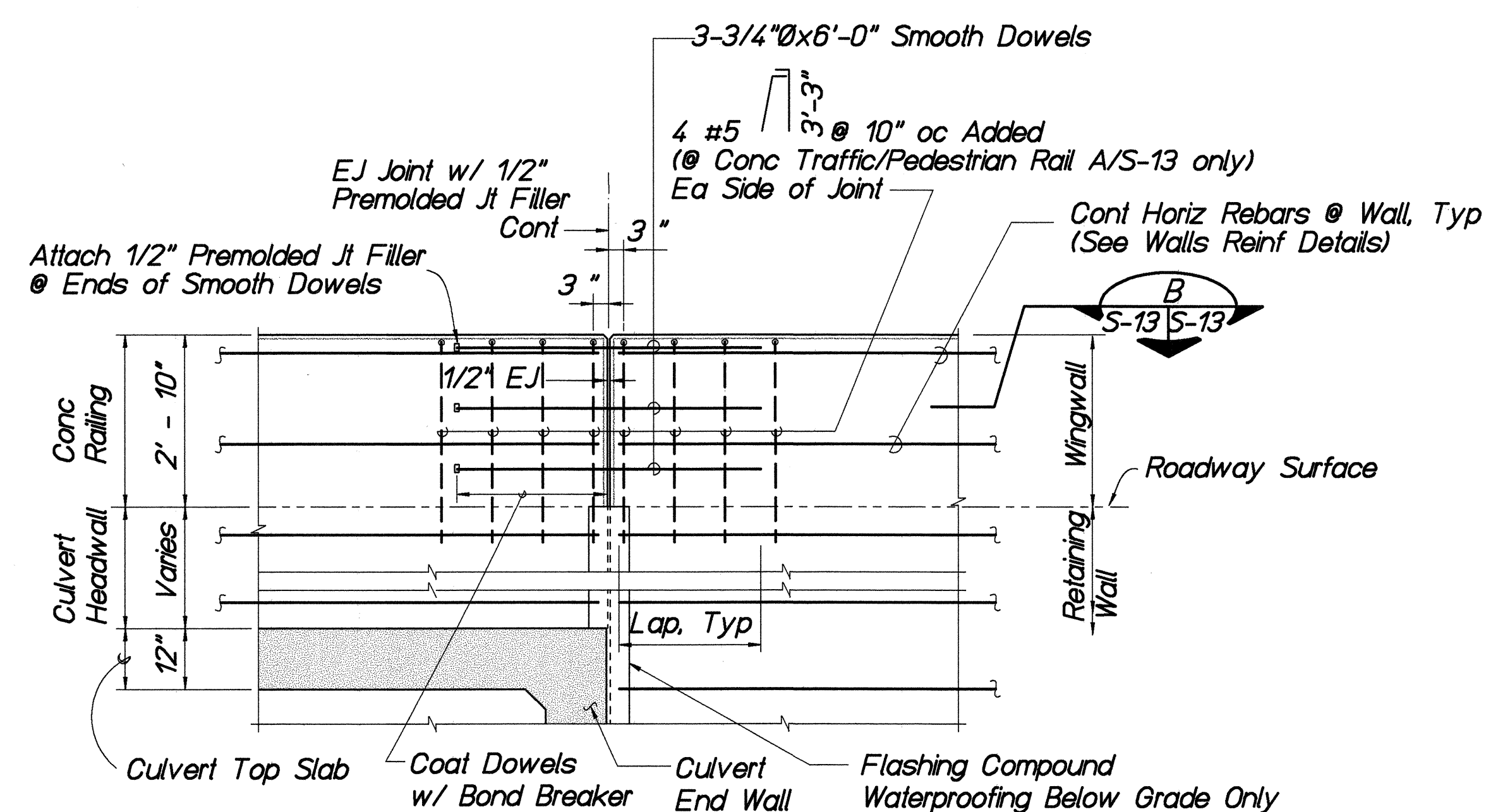
FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	164	189



PLAN SECTION

$1/2" = 1'-0"$

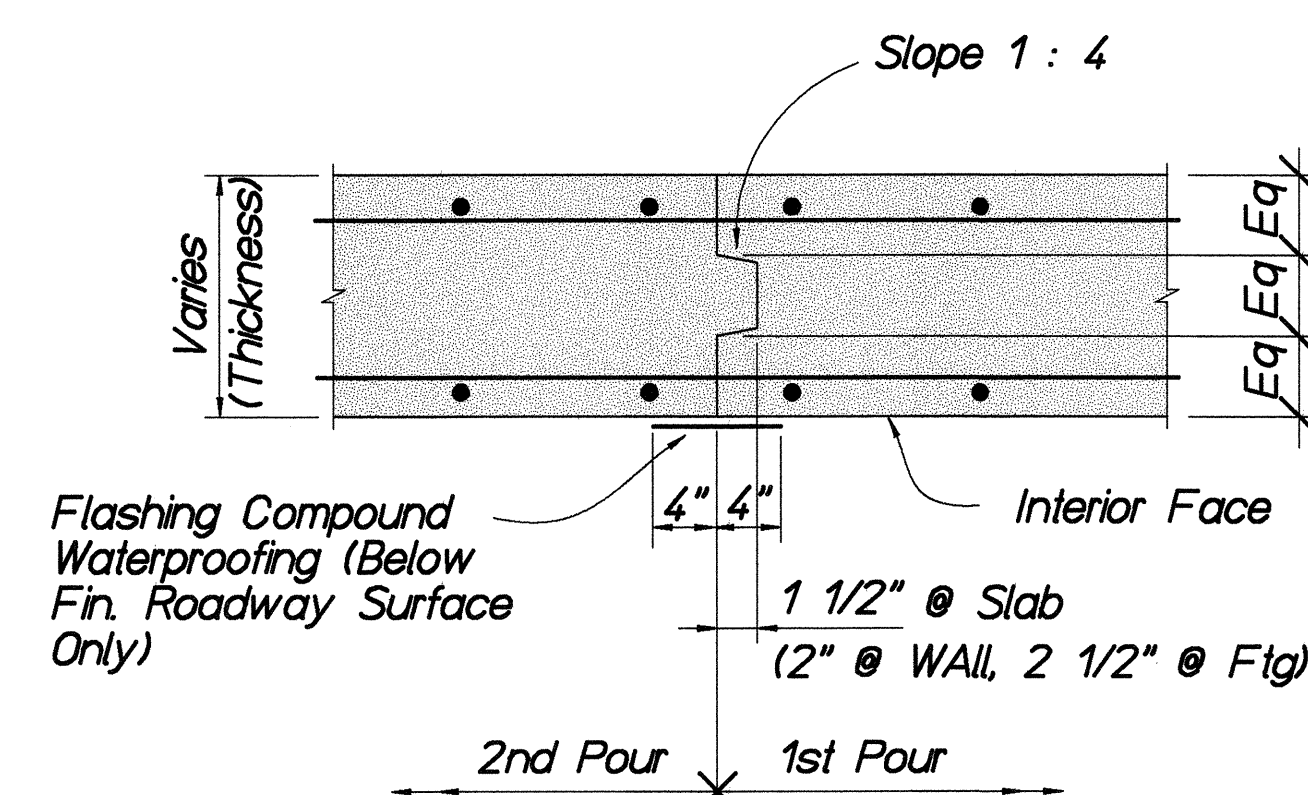




EXPANSION JOINT DETAIL
(CONDITION @ TRAFFIC RAILING SIDE)

1/2" = 1'-0" A
S-12 | S-13

(Metal Pedestrian Rail not Shown for Clarity)

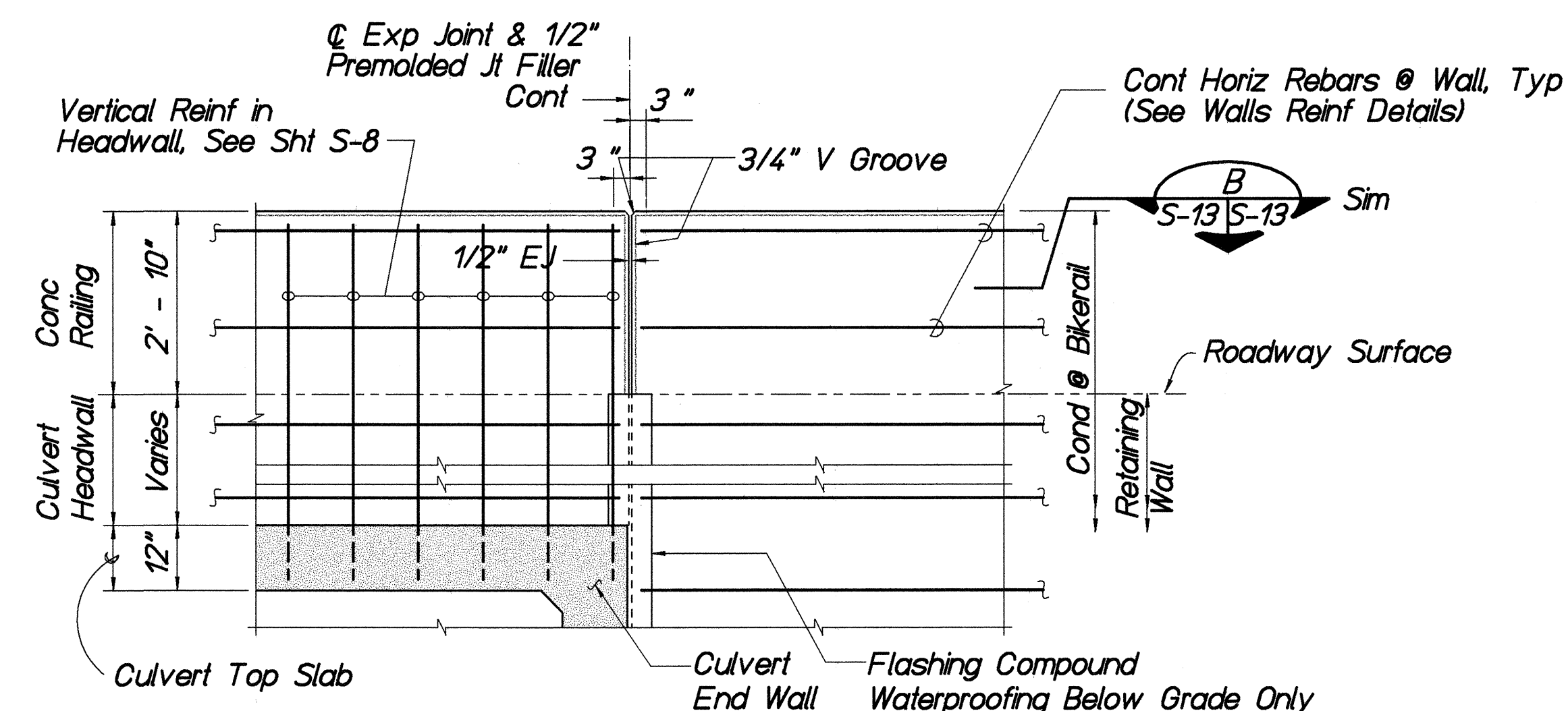


CONSTRUCTION JOINT DETAIL

1"= 1'-0"

S-6 S-13

D

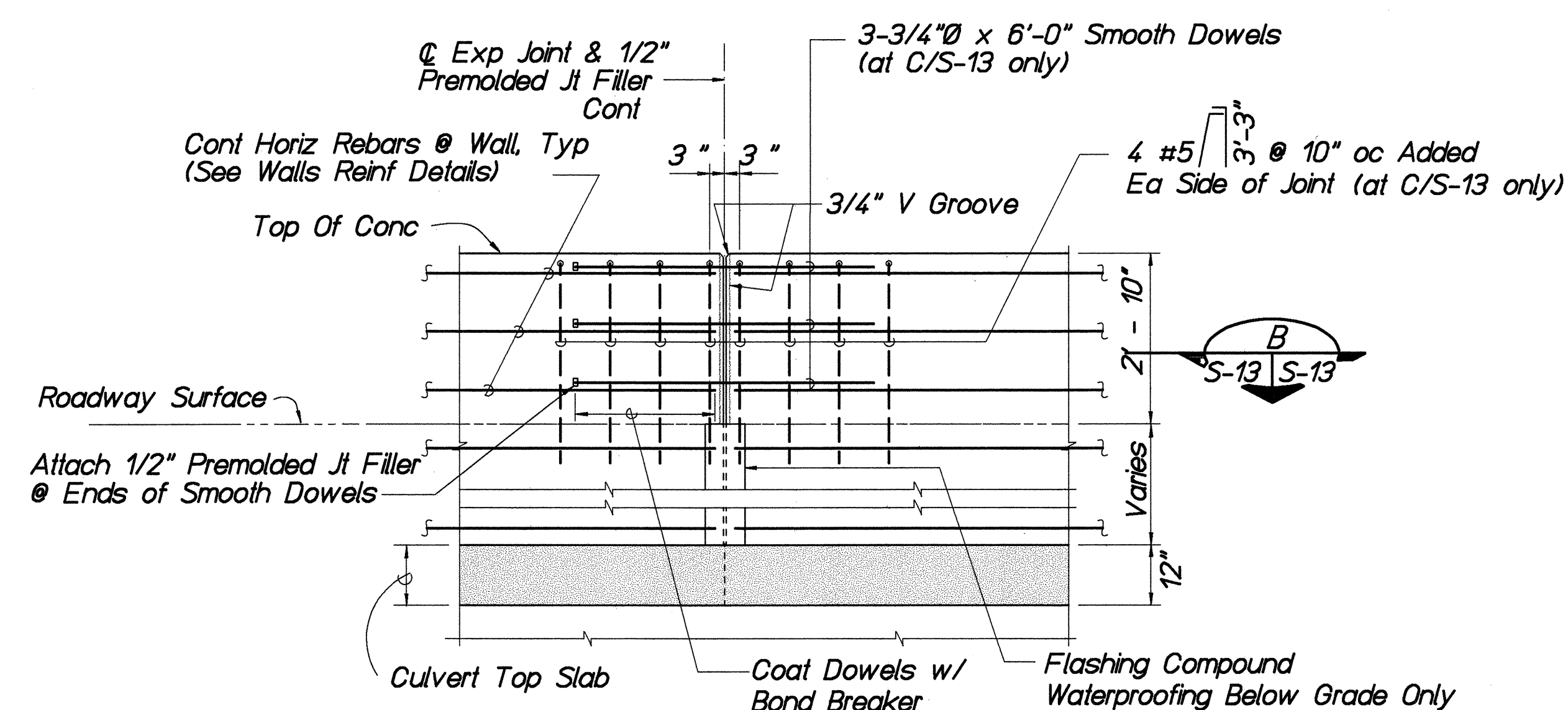


EXPANSION JOINT DETAIL
(CONDITION @ BIKERAIL SIDE)

1/2" = 1'-0"

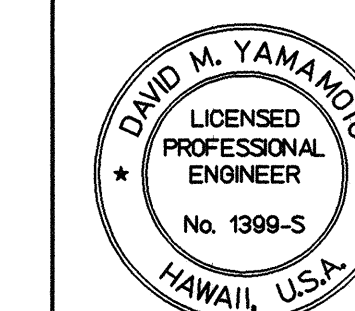
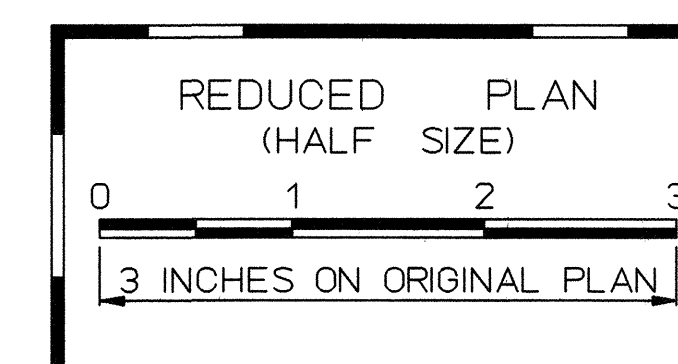
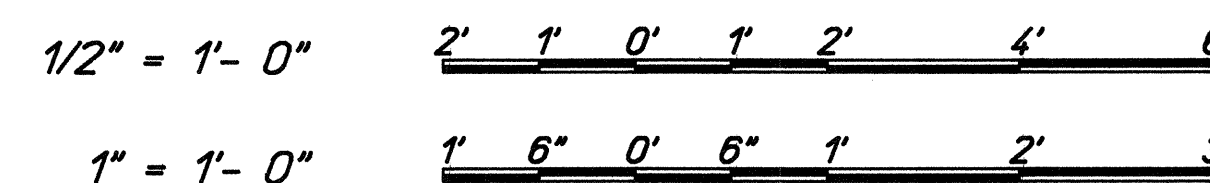
(Metal Bikerail not Shown for Clarity)

A1
S-11 S-13



EXPANSION JOINT DETAIL
 1/2" = 1'-0"
 (Metal Railing not Shown for Clarity)

The diagram illustrates the expansion joint detail between two bridge spans, labeled C and C1. Span C is shown on the left, with its centerline marked by a vertical line and labeled S-12. The right end of Span C is labeled S-13. Span C1 is shown on the right, with its left end labeled S-11 and its centerline marked by a vertical line and labeled S-13. A dimension line with arrows at both ends indicates a distance of S-6 from the expansion joint to the center of each span. The scale is 1/2" = 1'-0". A note states "(Metal Railing not Shown for Clarity)".



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT AT STA. 145+87

MOKULELE HIGHWAY WIDENING

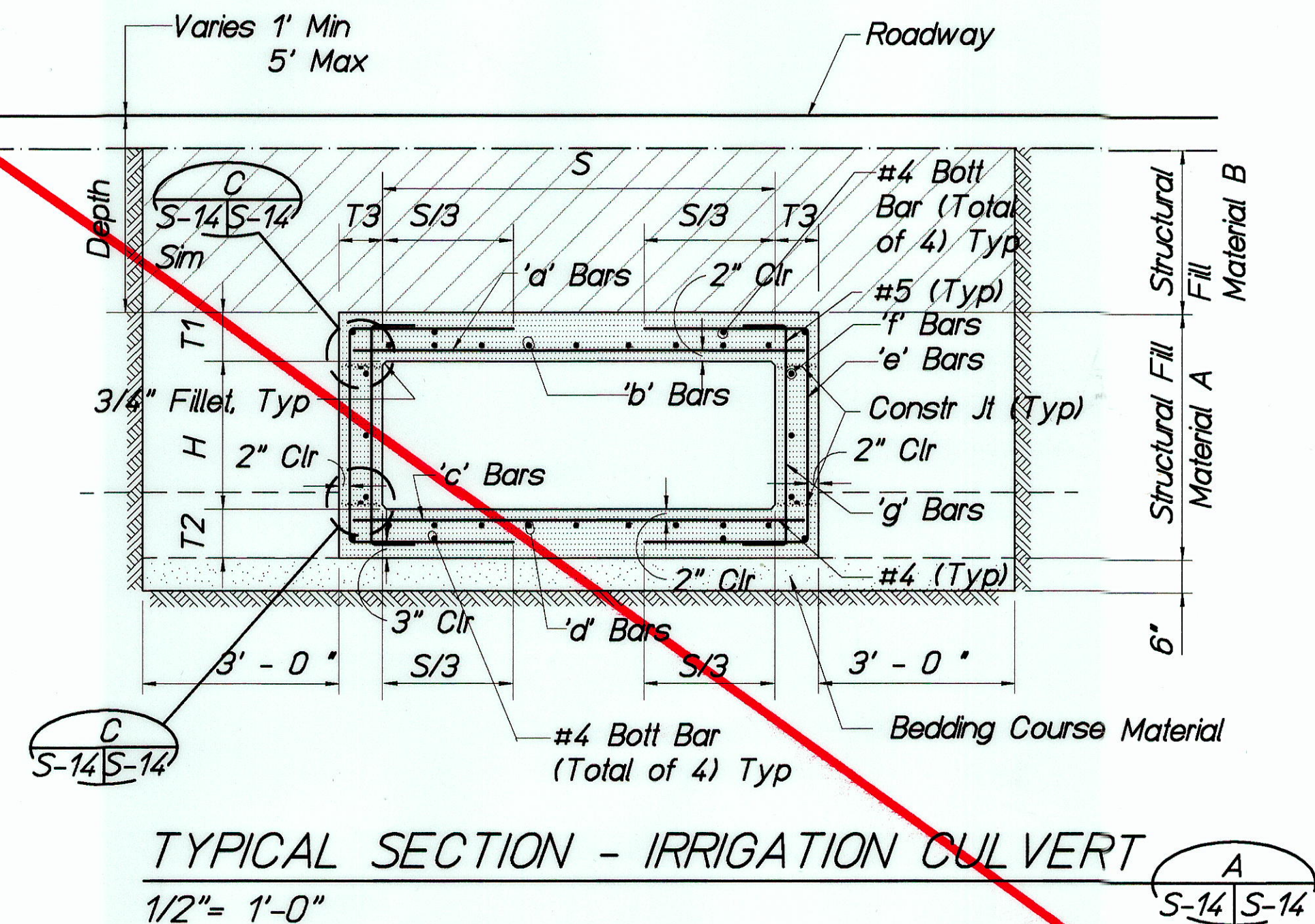
Vicinity of Cane Haul Road
to

Federal - Aid Project No. NH - 0311 (5)

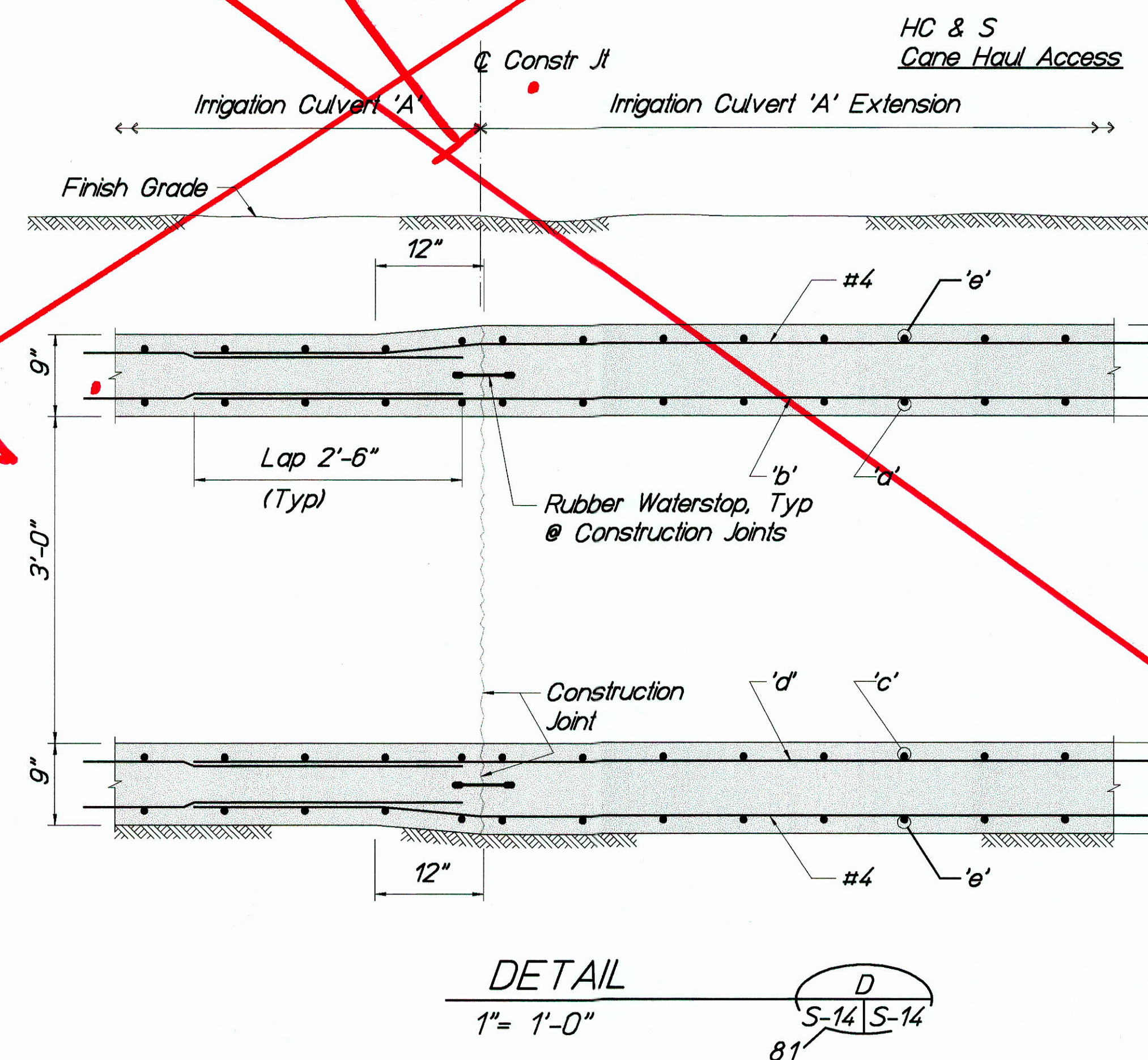
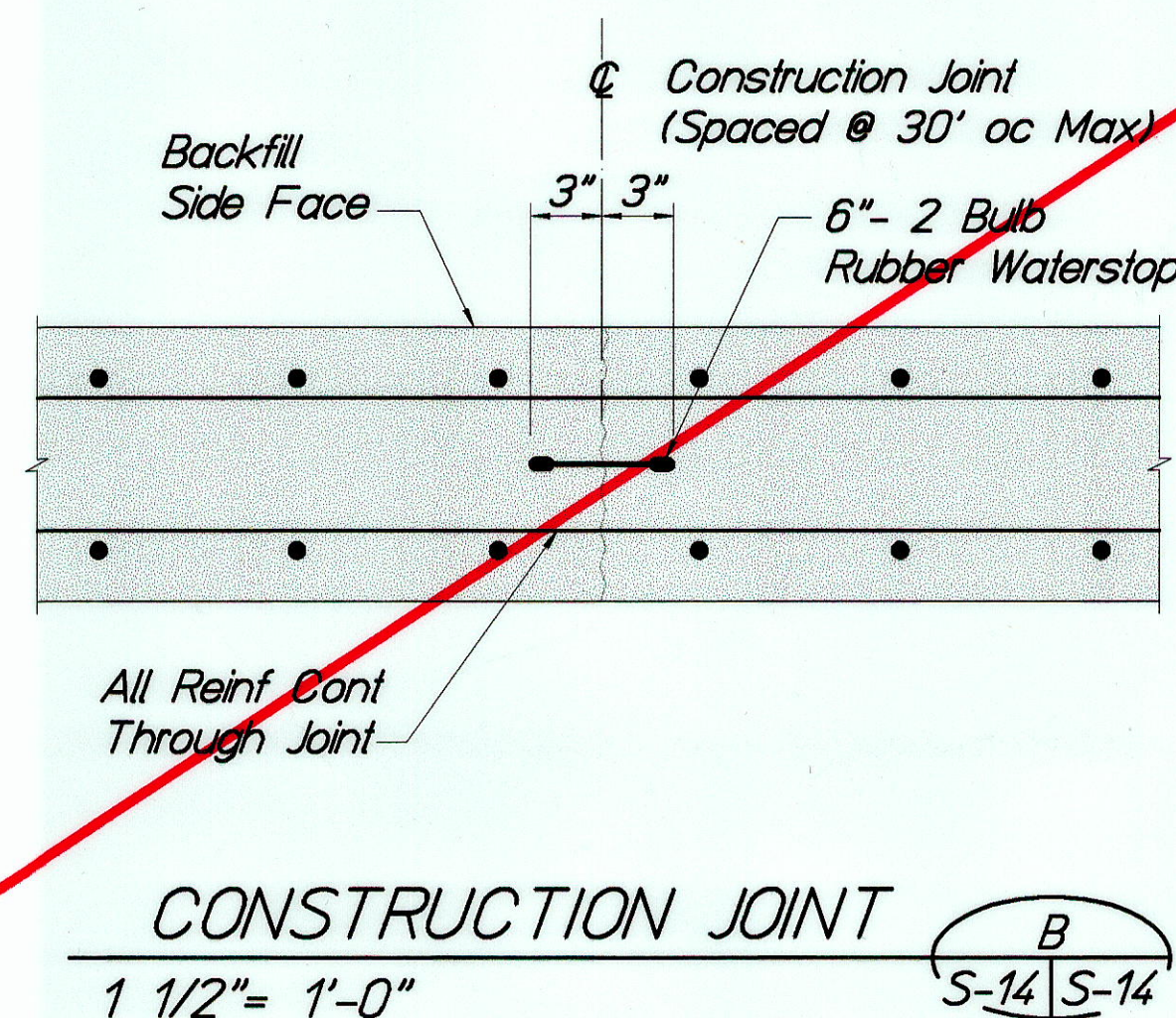
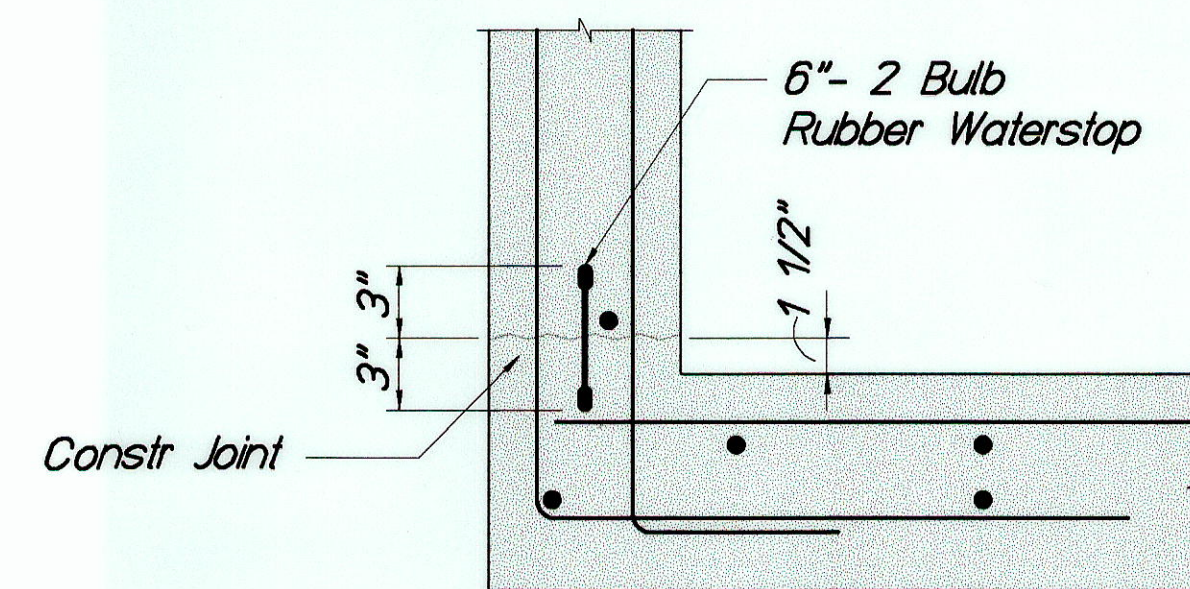
Scale: as Shown Date: Oct 2002

SHEET No. S-13 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL - AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH - 0311 (5)	2003	165	189



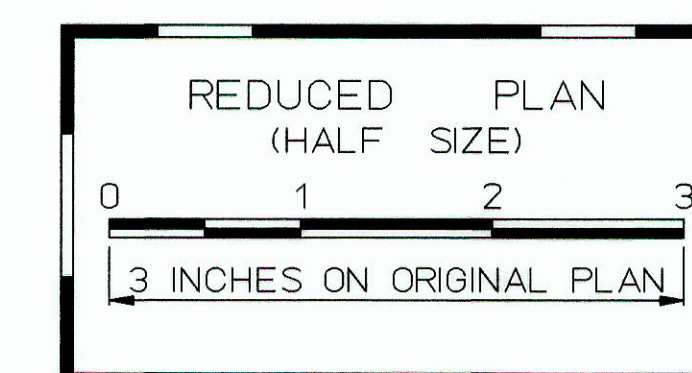
SCHEDULE - IRRIGATION CULVERTS				
Irrigation Culvert	'A'	'A' Extension	'B'	'C'
Overall Length, Ft	350	55 (Verify w/ Civil Dwg)	222	215
Span, 'S'	8'	8'	5'	6'
Height, 'H'	3'	3'	3'	3'
Minimum Fill over Top Slab	1'	1'	1'	1'
Maximum Fill over Top Slab	5'	2'	5'	5'
Dimensions	Top Slab, 'T1'	9"	10"	8"
	Bot Slab, 'T2'	9"	10"	8"
	Wall 'T3'	8"	10"	8"
Reinforcing Bars (Grade 60)	'a'	#6 @ 6"	#6 @ 5"	#5 @ 12" + #6 @ 12"
	'b' (Continuous)	10 #5	12 #5	6 #5
	'c'	#5 @ 6"	#5 @ 5"	#4 @ 6"
	'd' (Continuous)	6 #4	6 #5	5 #4
	'e'	#6 @ 6"	#5 @ 5"	#4 @ 6"
	'f' (Continuous)	3 #4	3 #4 ea Face	3 #4
	'g' Std Hook	#4 @ 12"	#5 @ 10"	#4 @ 12"



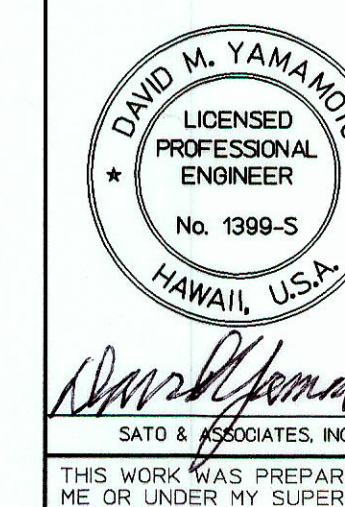
GRAPHIC SCALES

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

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



1/06/03	Added Detail 'D' Revised Section 'A' & Schedule for Irrigation Culvert 'A' Extension
Date	Revision



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

IRRIGATION CULVERTS 'A', 'B', & 'C'

MOKULELE HIGHWAY WIDENING
Vicinity of Cane Haul Road
to
Maui Humane Society
Federal - Aid Project No. NH - 0311 (5)

Scale: as Shown Date: Oct 2002

SHEET No. 8-14 OF 14 SHEETS

"AS-BUILT"

ADD. 165