

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-A311(6)R	2006	133	173

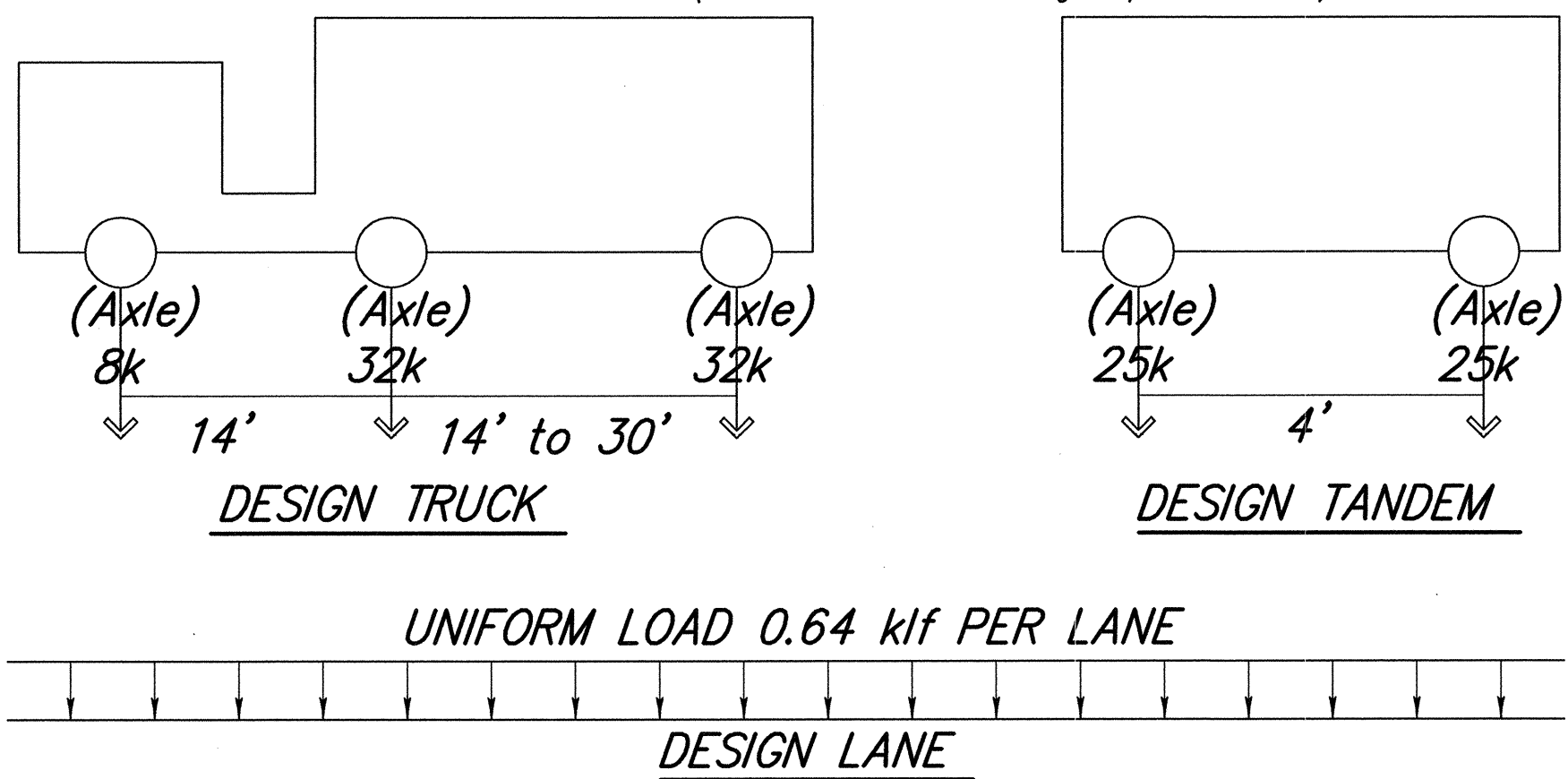
GENERAL NOTES

DESIGN CRITERIA

1- DESIGN SPECIFICATIONS ARE:
AASHTO 'LRFD Bridge Design Specifications', 3rd Edition (2004)

2- GEOTECHNICAL REPORT:
"Soils Investigation Report for Puunene Avenue/ Mokulele Highway Widening Project, Puunene, Maui, Hawaii, by Ernest K. Hirata & Associates, Inc., W.O. 99-3144, dated October 1, 1999

3- DESIGN LOADS ARE:
A- DEAD LOADS: Reinforced And Prestressed Concrete - 0.160 kcf
Future Asphalt - 0.025 ksf
Future Utilities On Eash Side Of Bridge - 0.150 kif
Soil - 0.120 kcf
B- LIVE LOADS HL-93 (Combined as Per Design Specifications)



C- DESIGN SPEED : 55 MPH

D- WIND LOADS: 100 mph Design Wind Speed At 30 ft Above The Ground For Wind Load On Structures.

E- SEISMIC LOADS:
Acceleration Coefficient - 0.25 G
Seismic Zone - '3'
Importance Category - 'Essential'
Soil Type - '1'

F- TRAFFIC RAILING LOADS: In Accordance With Railing Performance Level TL-4.

4- MATERIALS ARE:
A- CONCRETE:
Box Culverts - f'_c = 4 ksi
Barriers & Railings - f'_c = 4 ksi
Retaining Walls & Footings - f'_c = 4 ksi
Retaining Walls & Footings - f'_c = 4 ksi
These Are 28 Days Strengths Except As Noted

B. CONCRETE ADMIXTURES:

- Shrinkage Reducing Admixture Shall Be Added To The Concrete Mixes For C.I.P. Box Culvert Top & Bottom Slabs. Refer to The Special Provisions - Part II, Section 601 "Structural Concrete".
- Corrosion Inhibiting Admixture Shall Be Added To The Concrete Mixes For All Concrete (Except Drilled Shafts). Refer To The Special Provisions - Part II, Section 601, "Structural Concrete".

C- REINFORCING STEEL:
Per ASTM A615 Grade 60 (Unless Noted Otherwise).

D- MISCELLANEOUS STEELS:
Per ASTM A36, Hot Dipped Galvanized Per ASTM A123, Unless Noted Otherwise.

5- SOIL DESIGN PARAMETERS:

A- Foundations Shall Be Designed For The Following Maximum Bearing Values:
Service Limit State = 2500 psf
Strength Limit State = 4500 psf
Extreme Event Limit State = 7500 psf

B- Lateral Earth Pressure / Values
Box Culverts Retaining Walls
Active 55 pcf 45 pcf
Passive 300 pcf 300 pcf
Coefficient of Sliding Friction ----- 0.4

6- DESIGN METHODS AND ALLOWABLE STRESSES ARE:

A- REINFORCED CONCRETE: Strength & Service Limit State.
B- SEISMIC DESIGN: Extreme Event Limit State.

REINFORCING NOTES

- ACI STANDARD RADII SHALL BE USED TO BEND ALL REINFORCEMENT UNLESS NOTED OTHERWISE. ALL BEND DIMENSIONS GIVEN ARE OUT TO OUT OF BARS
- BAR SPACINGS ARE GIVEN IN INCHES UNLESS NOTED OTHERWISE.
- EXCEPT AS NOTED ON THE PLANS, CONCRETE COVER TO REINFORCEMENT (MAIN BARS UNLESS NOTED OTHERWISE) SHALL BE:

Headwalls, Retaining Walls, Frontface - 2 in
Headwalls, Retaining Walls, Backface (Formed) - 2 in
Footings, Top - 2 in
Footings, Bottom - 3 in
Footings, Sides - 3 in
Culvert Top Slab, Top & Bottom - 2 in
Culvert Bottom Slab, Bottom - 3 in
Culvert Bottom Slab, Top - 2 in
Culvert Walls, Exterior - 2 in
Culvert Walls, Interior - 2 in

CONSTRUCTION NOTES:

- CONSTRUCTION SPECIFICATIONS ARE THE 'HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND PUBLIC WORKS CONSTRUCTION' 1994, AND THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS, 1998, AND SPECIAL PROVISIONS THERETO
- ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4 in x 3/4 in UNLESS NOTED OTHERWISE.
- CONSTRUCTION JOINTS SHALL BE LOCATED ONLY AT THOSE LOCATIONS SHOWN ON THE PLANS, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS AND NOT RELY UPON THESE PLANS FOR ACCESS ROAD OR STREAM LOCATION, ETC
- THE CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL UTILITIES AND AVOID DAMAGE THERETO.

OTHER NOTES

- ALL STATIONS AND LONGITUDINAL DIMENSIONS ARE MEASURED ALONG THE BASELINES.
- ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS NOTED OTHERWISE. ALL SECTIONS ARE CUT HORIZONTALLY OR VERTICALLY UNLESS NOTED OTHERWISE.
- ALL VIEWS ARE LOOKING UPSTATION UNLESS NOTED OTHERWISE.
- ALL ELEVATIONS ARE REFERRED TO MEAN SEA LEVEL.

LOAD CAPACITY RATINGS

LOAD RATING FACTORS (RF) FOR THE BOX CULVERTS ARE AS FOLLOWS:

- PRECAST CULVERTS
A. INVENTORY LEVEL RF = 2.176
B. OPERATING LEVEL RF = 3.632
- C.I.P. CULVERT TOP SLAB
A. INVENTORY LEVEL RF = 3.835
B. OPERATING LEVEL RF = 6.40

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

DEAN A. DOI

LICENSED PROFESSIONAL ENGINEER

No. 5580-S

HAWAII, U.S.A.

SATO & ASSOCIATES, INC.

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STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

GENERAL NOTES

MOKULELE HIGHWAY WIDENING

Maui Humane Society

to

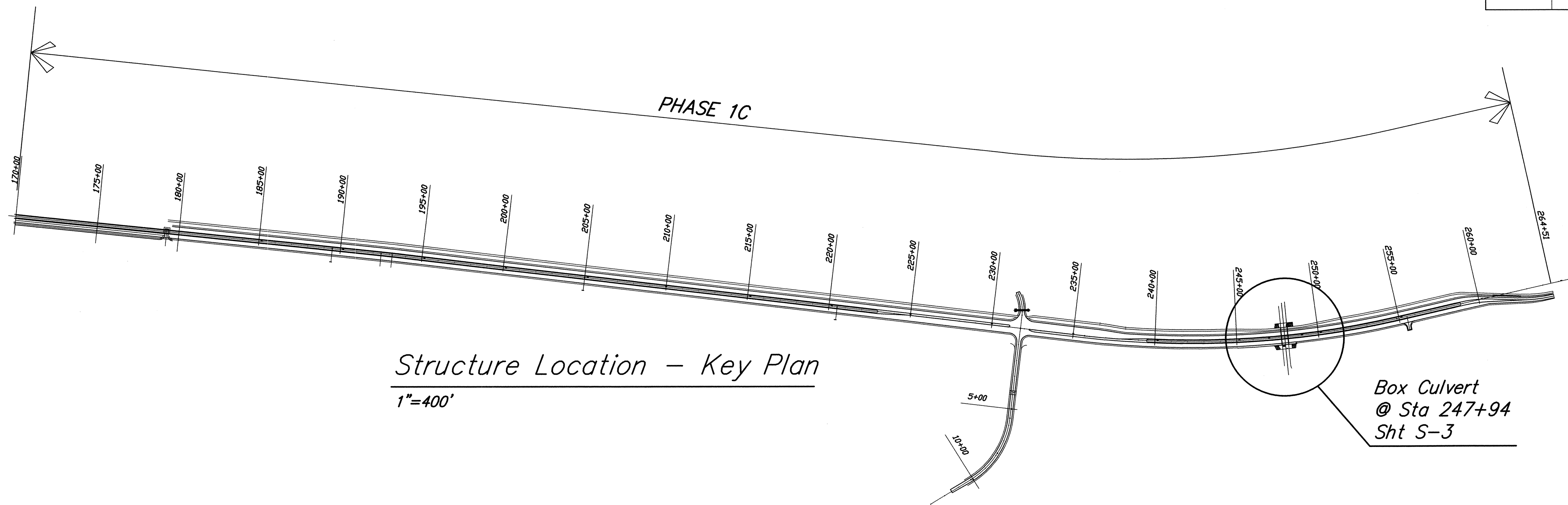
Vicinity of Kolaloa Bridge

Federal-Aid Project No. NH-A311 (6)R

Scale: as Shown Date: Jun 2005

SHEET No. 8-1 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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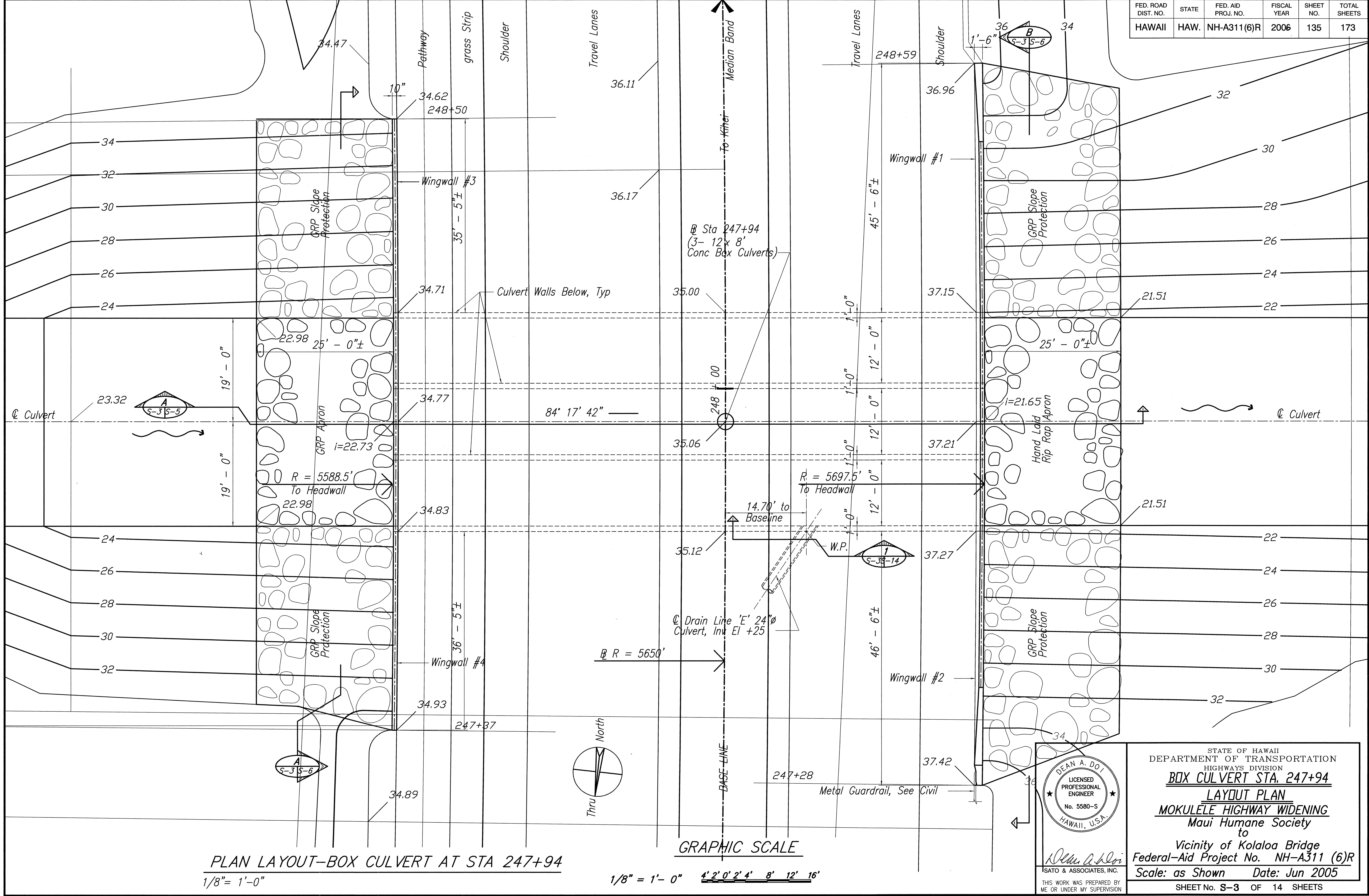
**LOCATION - KEYPLAN
& INDEX OF STRUCTURAL DRAWINGS**

MOKULELE HIGHWAY WIDENING
Maui Humane Society
to
Vicinity of Kolaloa Bridge
Federal-Aid Project No. NH-A311 (6)R

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SHEET No. S-2 OF 14 SHEETS

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BOX CULVERT STA. 247+94

LAYOUT PLAN

MOKULELE HIGHWAY WIDENING

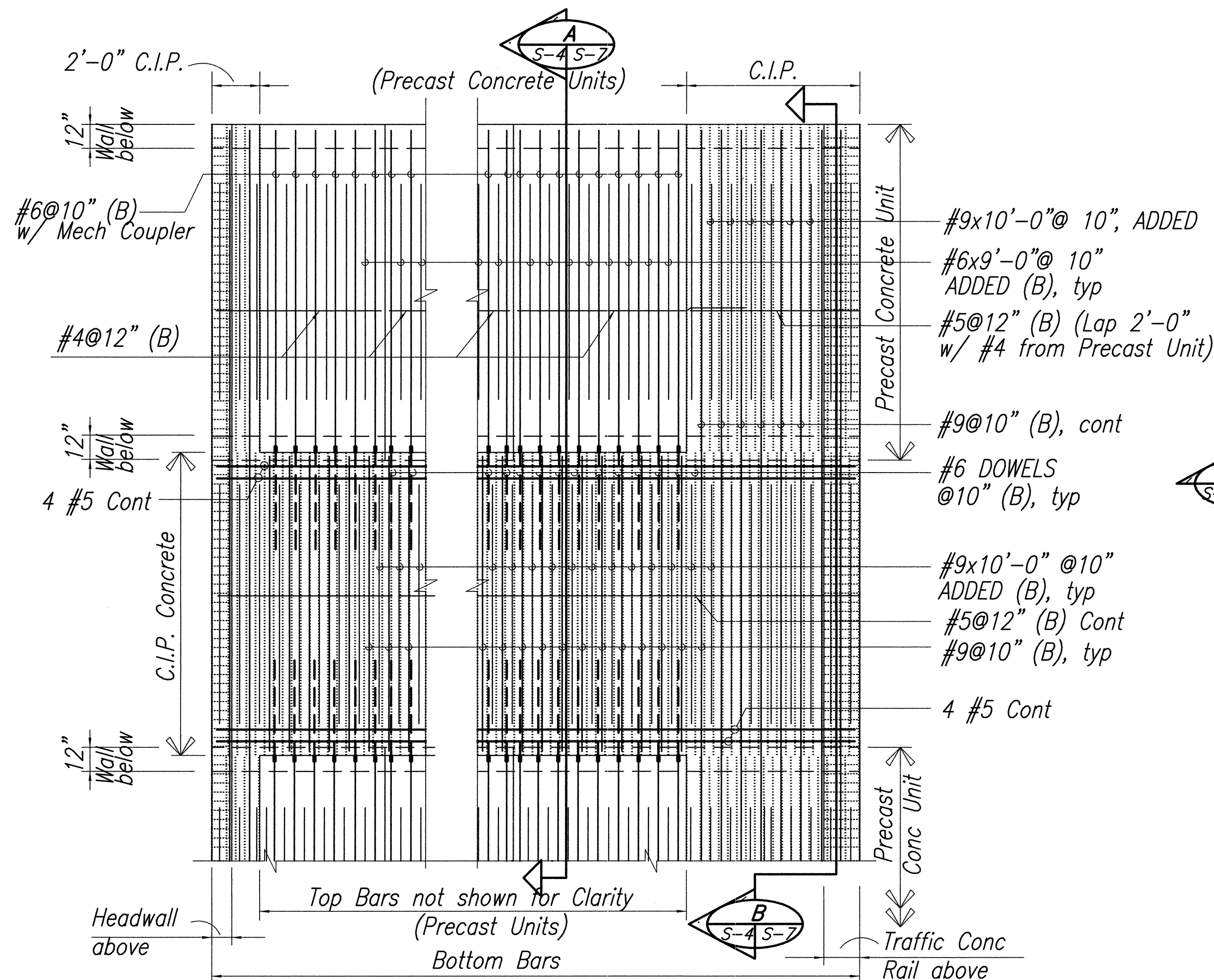
Maui Humane Society
to
Vicinity of Kolaloa Bridge

Federal-Aid Project No. NH-A311 (6)R

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SHEET No. S-3 OF 14 SHEETS

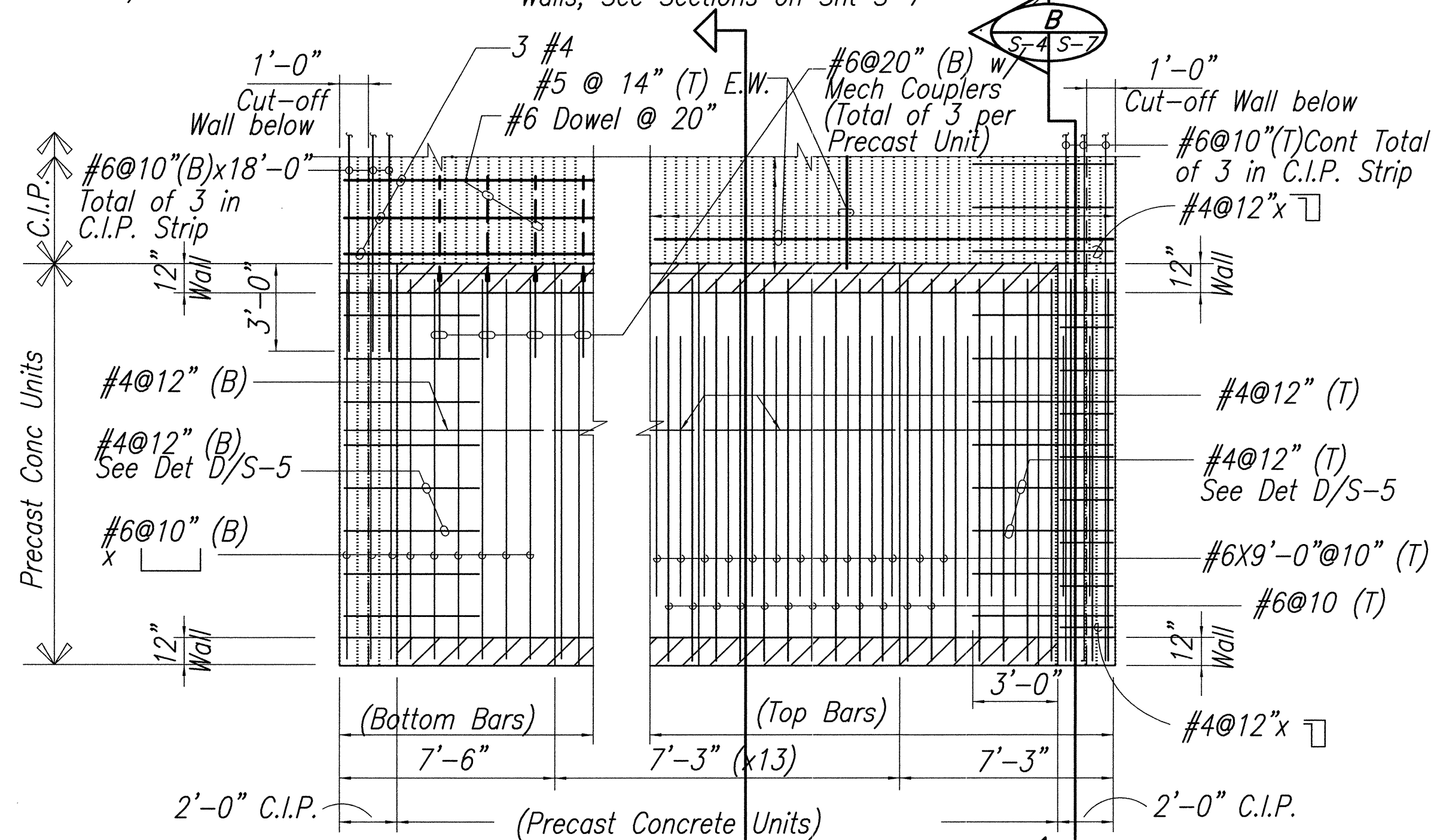
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CONCRETE TOP SLAB REINFORCEMENT DETAIL

1/4" = 1'-0"

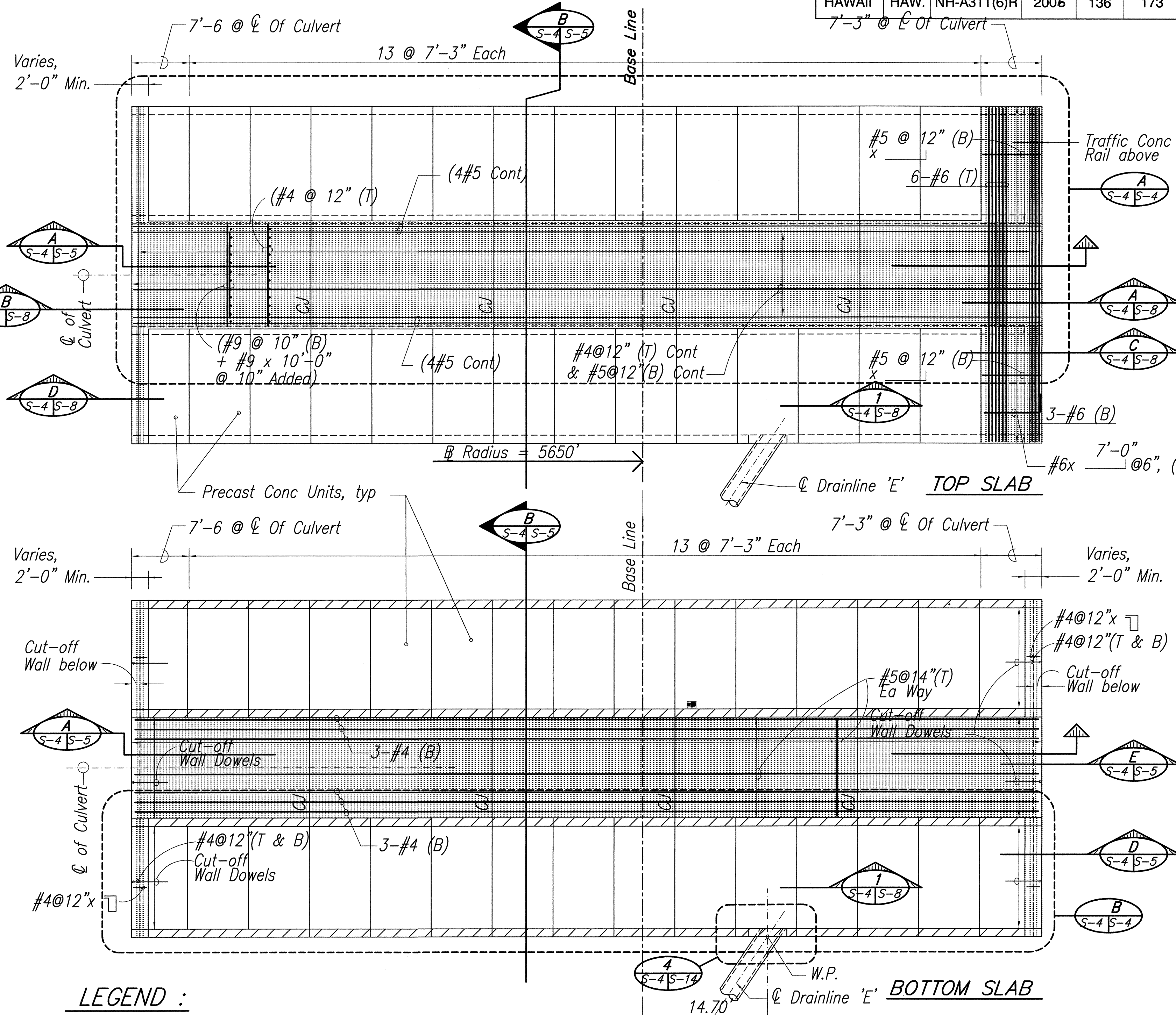
Note: For Top Bars & Rebar Extensions from Walls, See Sections on Sht S-7



CONCRETE BOTTOM SLAB REINFORCEMENT DETAIL

1/4" = 1'-0"

NOTE: For Rebar Extension from Walls, See Sections on Sht S-7



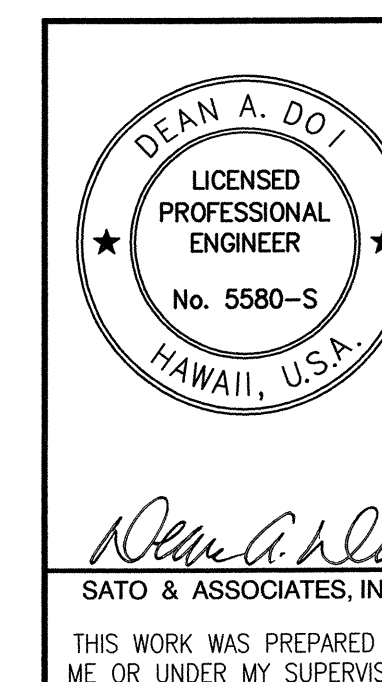
LEGEND :

- C.I.P. Concrete
- Precast Concrete in section (@ 1/4"=1'-0")
- Precast Concrete Unit (@ 1/8"=1'-0")
- CJ Construction Joint

GRAPHIC SCALES

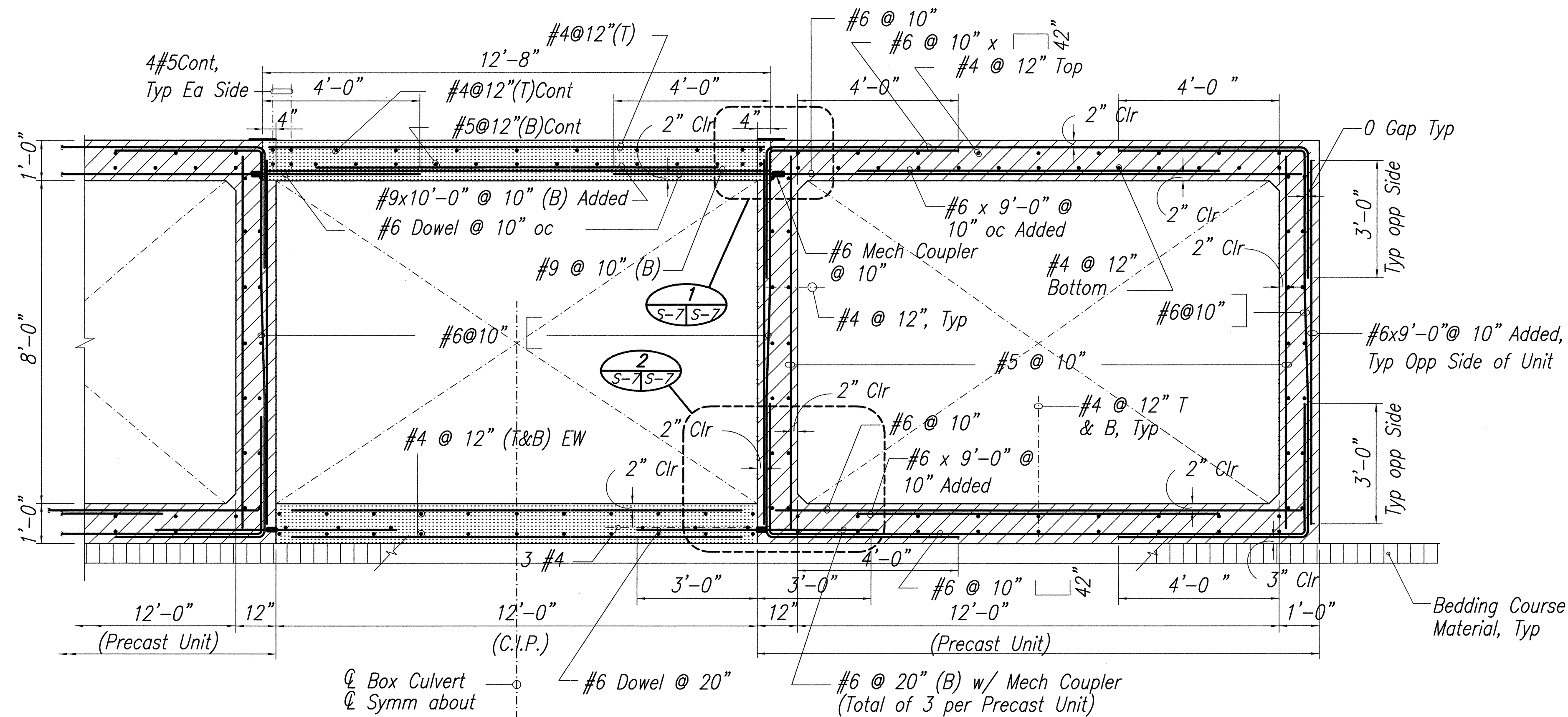
1/8" = 1'-0" 4' 2' 0' 2' 4' 8' 12' 16'

1/4" = 1'-0" 1' 0' 1' 2' 4' 6' 8' 10'



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT STA. 247+94
REINFORCING PLAN
MOKULELE HIGHWAY WIDENING
Maui Humane Society
to
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SHEET No. S-4 OF 14 SHEETS

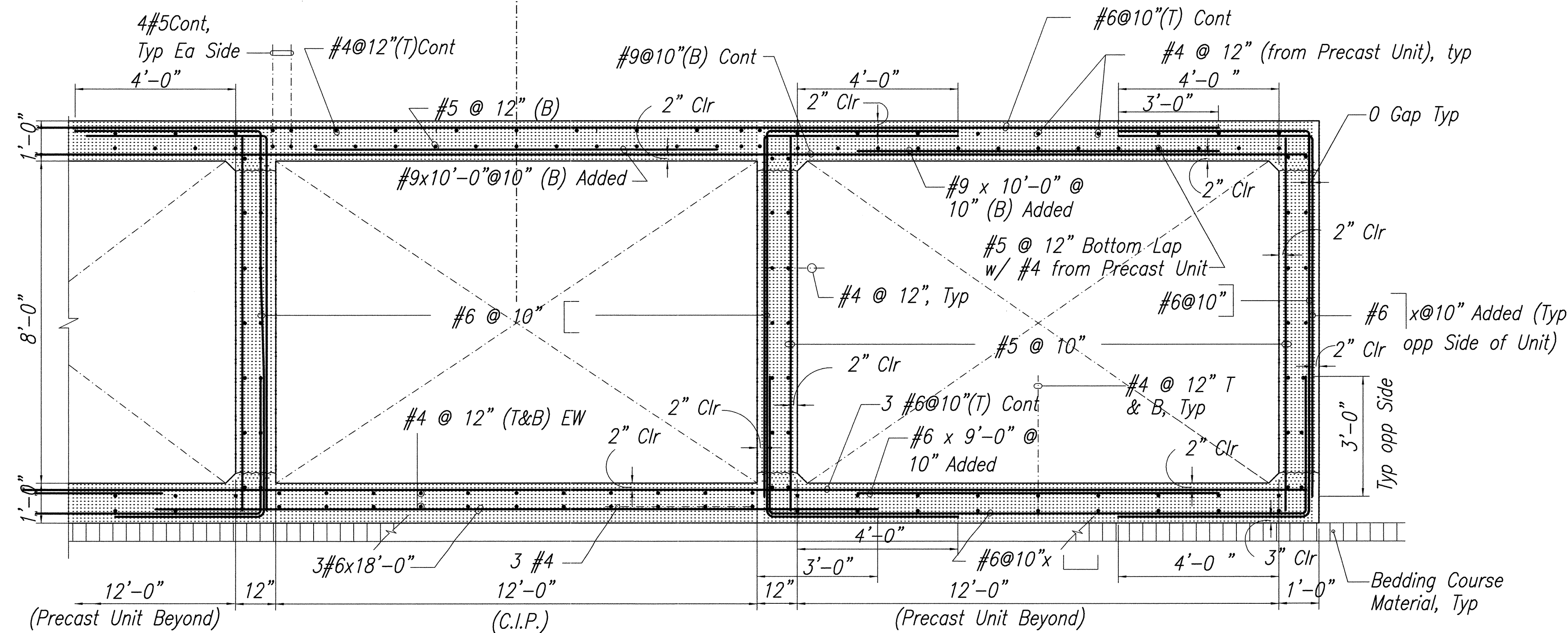
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CROSS SECTION - BOX CULVERT

1/2" = 1'-0"

A
S-5 S-7

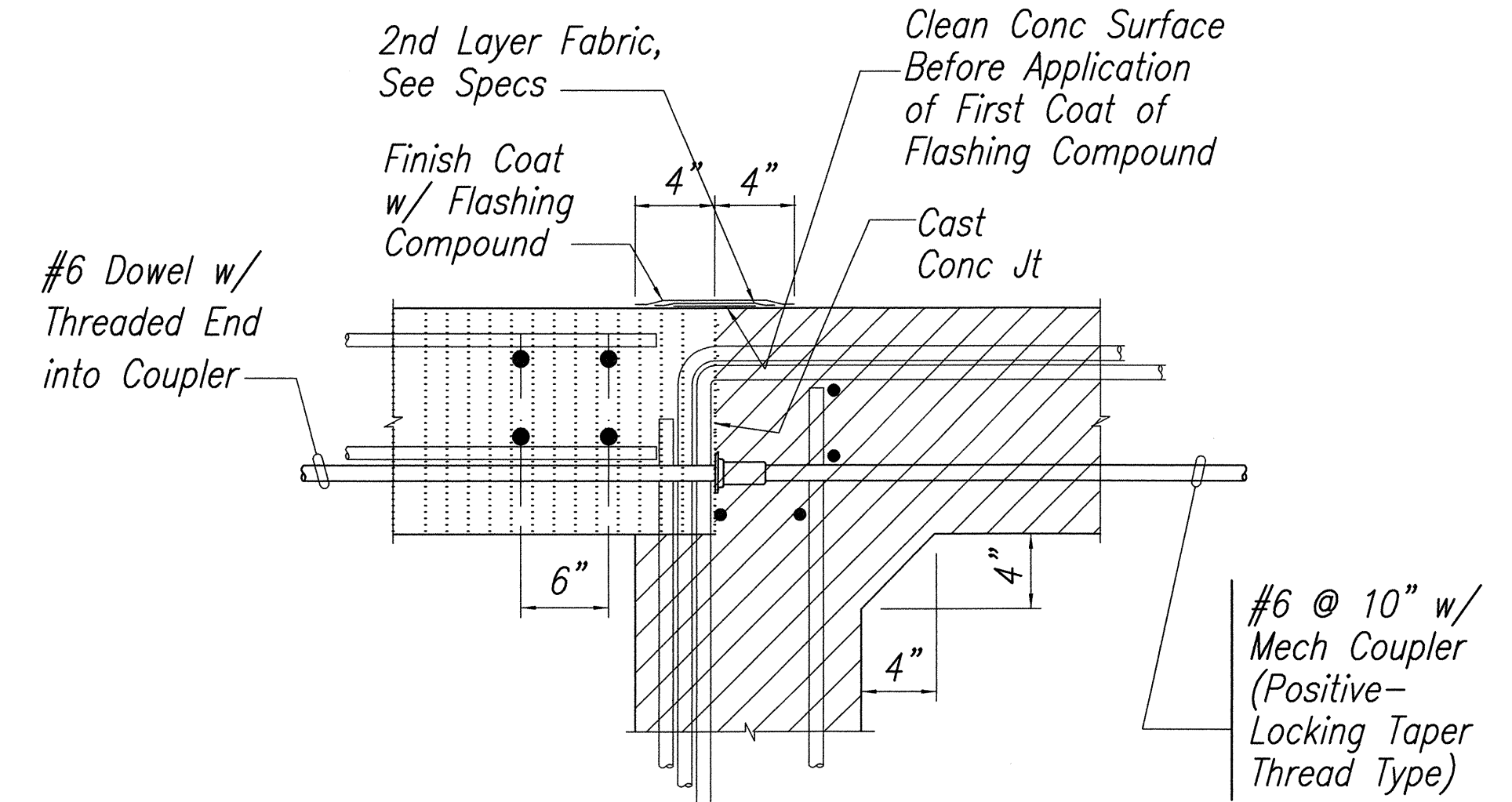
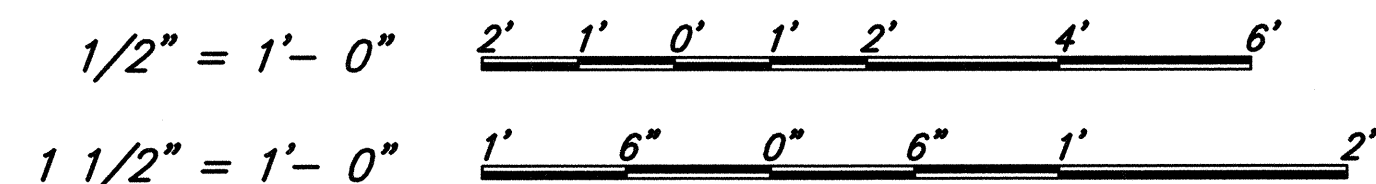


CROSS SECTION - END BOX CULVERT HEAR HEADWALL

1/2" = 1'-0"

B
S-4 S-7

GRAPHIC SCALES



NOTE:

Flashing Compound For Construction Joint Waterproofing Shall Conform to The Requirement of ASTM Specifications D4586 As a Plying Cement In The Construction of Membrane Waterproofing Systems With Fabrics Conforming to ASTM Specification D1668 (Asphalt Types). The Product Shall Adhere to Damp Concrete And Masonry Surfaces.

TYP FLASHING COMPOUND WATERPROOFING DETAIL

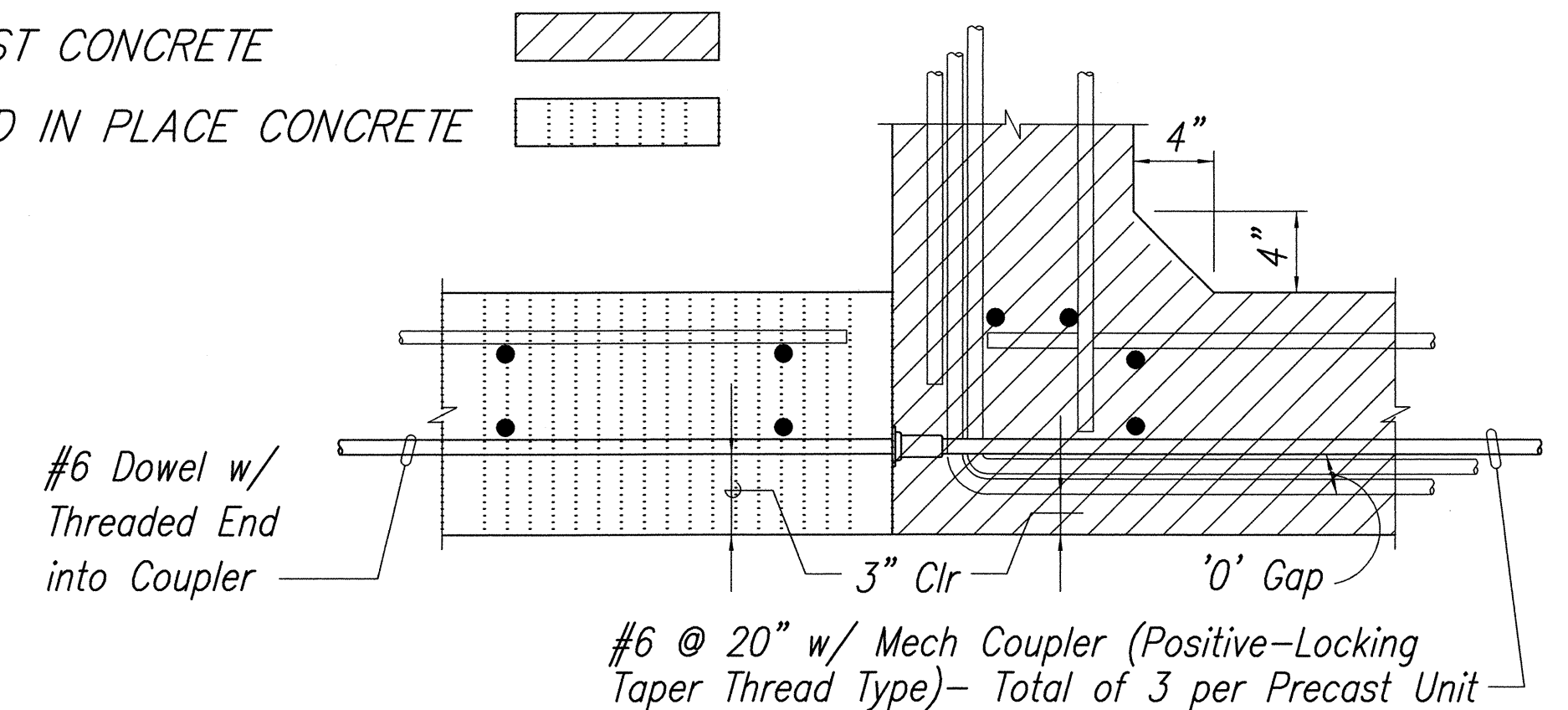
N.T.S.

1
S-7 S-7

LEGEND:

PRECAST CONCRETE

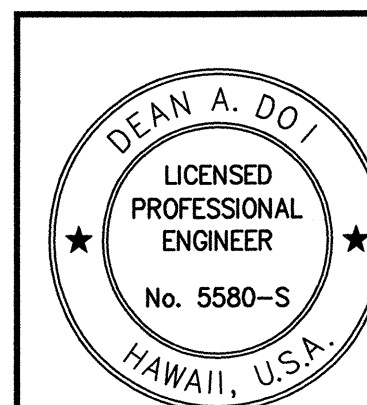
POURED IN PLACE CONCRETE



DETAIL

1 1/2" = 1'-0"

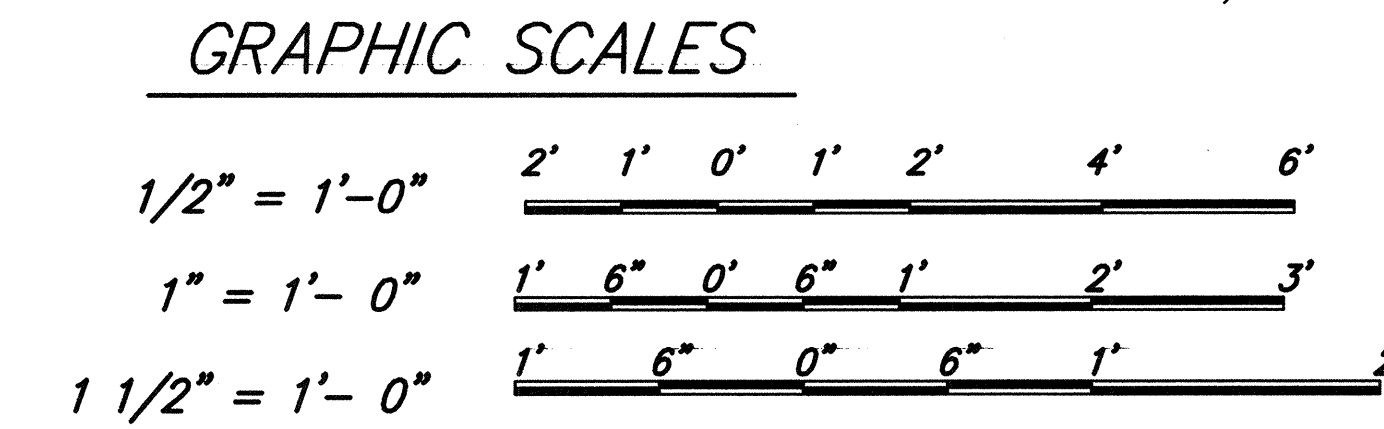
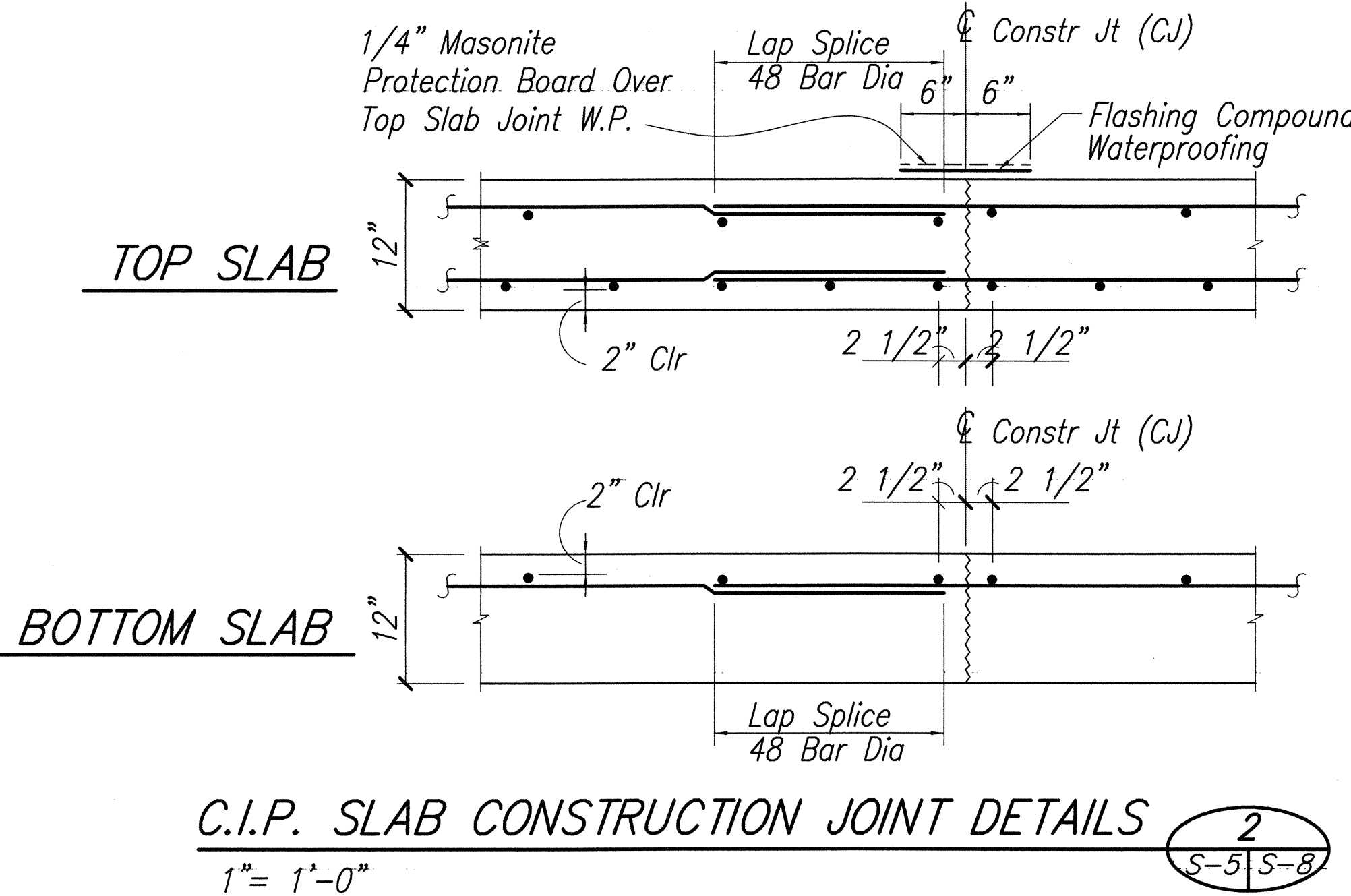
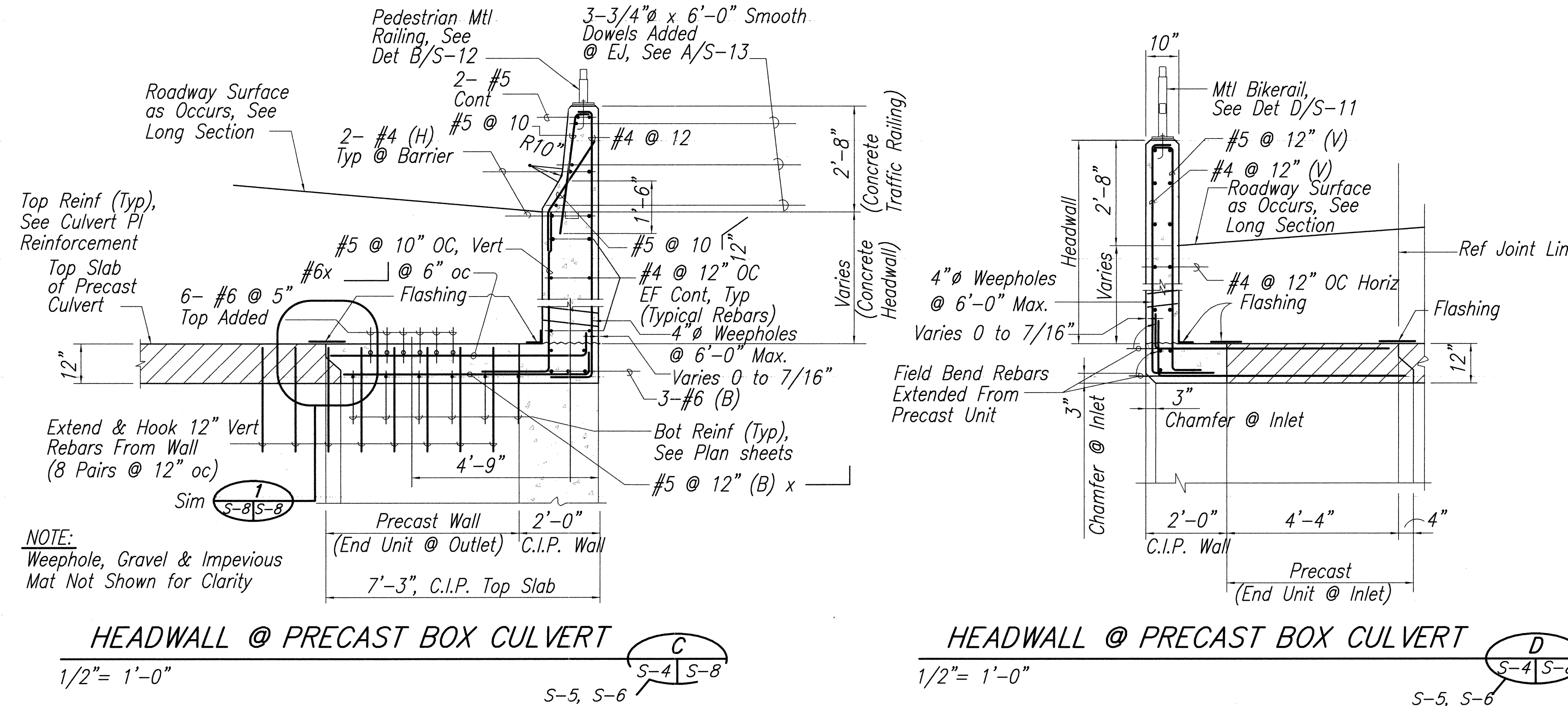
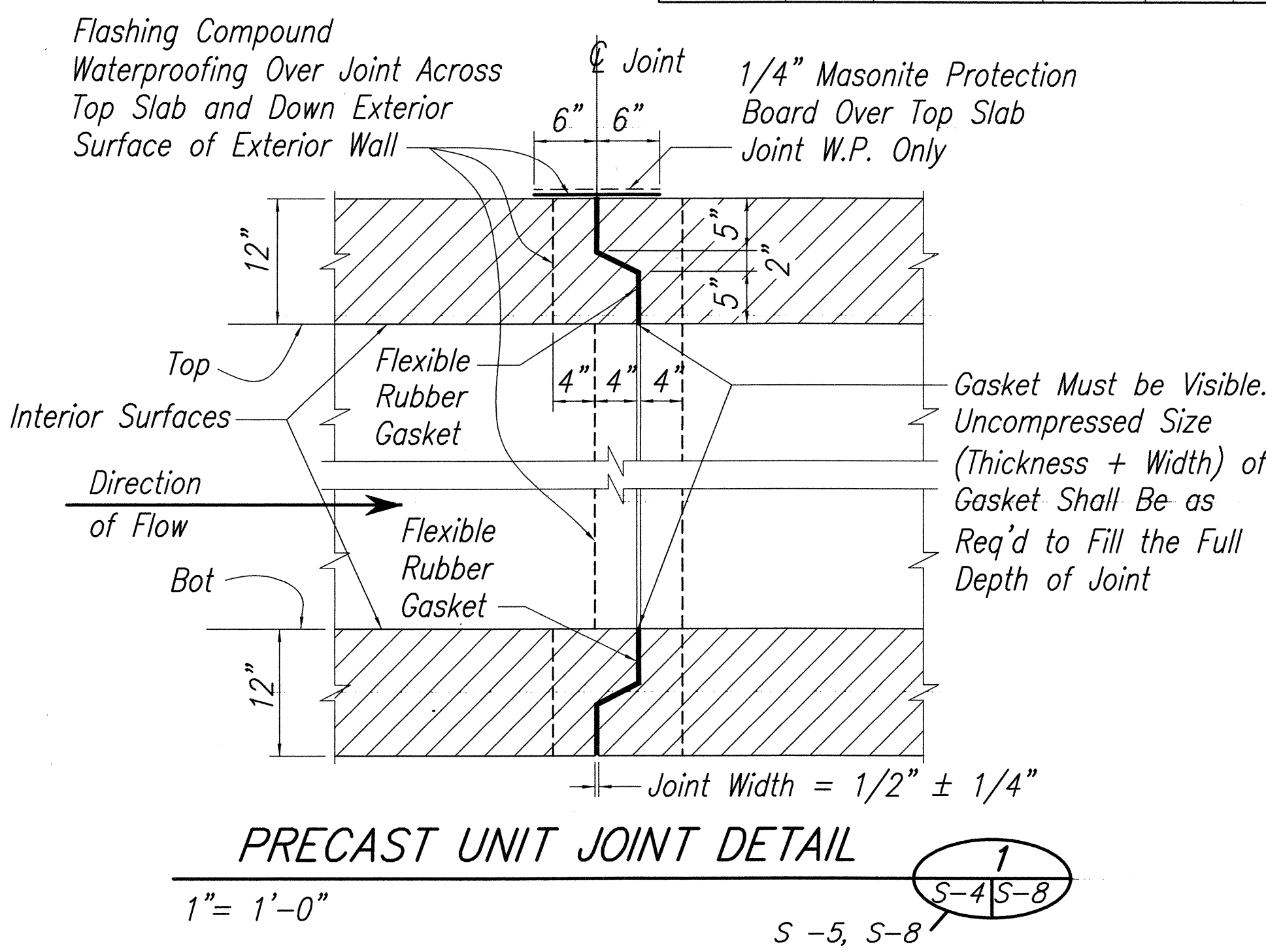
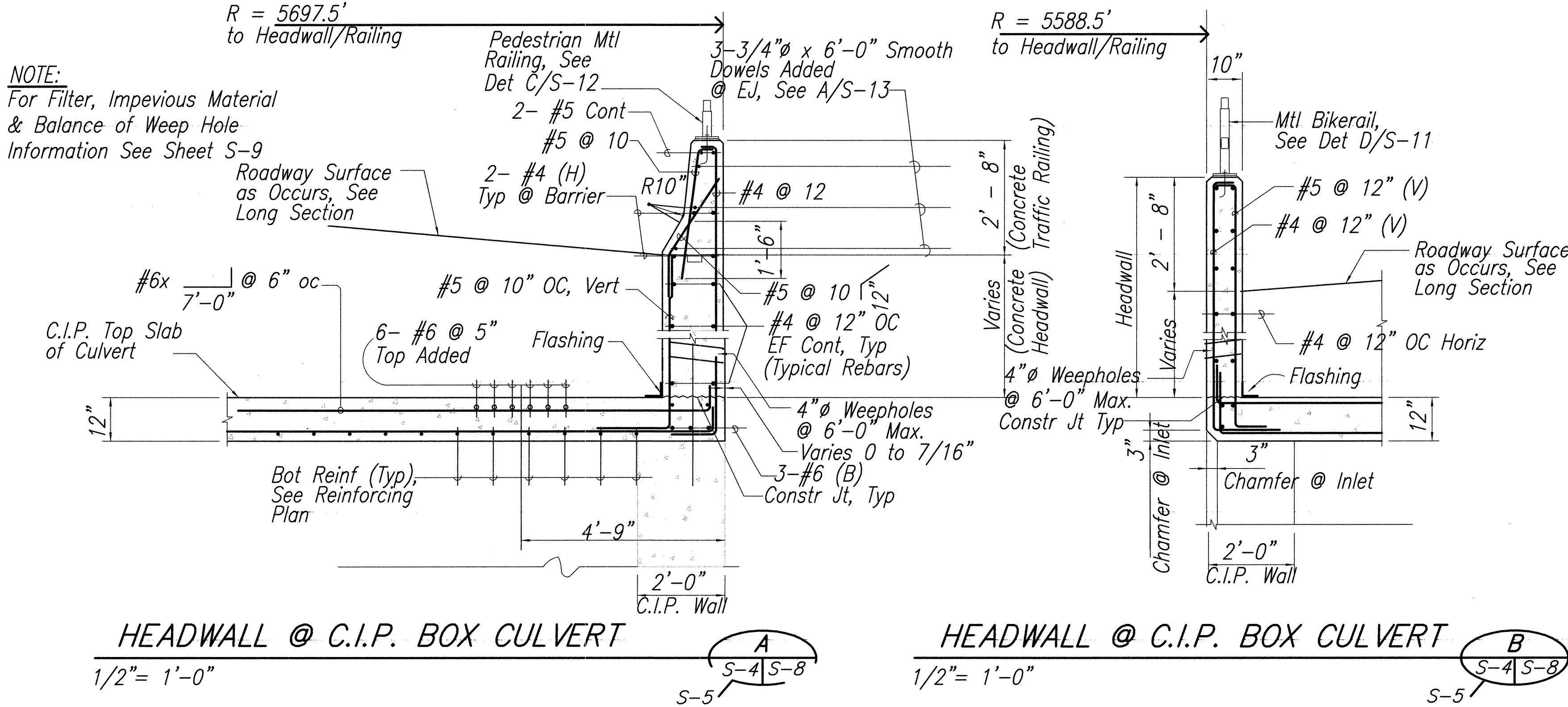
2
S-7 S-7



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT REINFORCING DETAILS
CROSS SECTION
MOKULELE HIGHWAY WIDENING
Maui Humane Society
to
Vicinity of Kolaloa Bridge
Federal-Aid Project No. NH-A311 (6)R
Scale: as Shown Date: Jun 2005
SHEET No. S-7 OF 14 SHEETS

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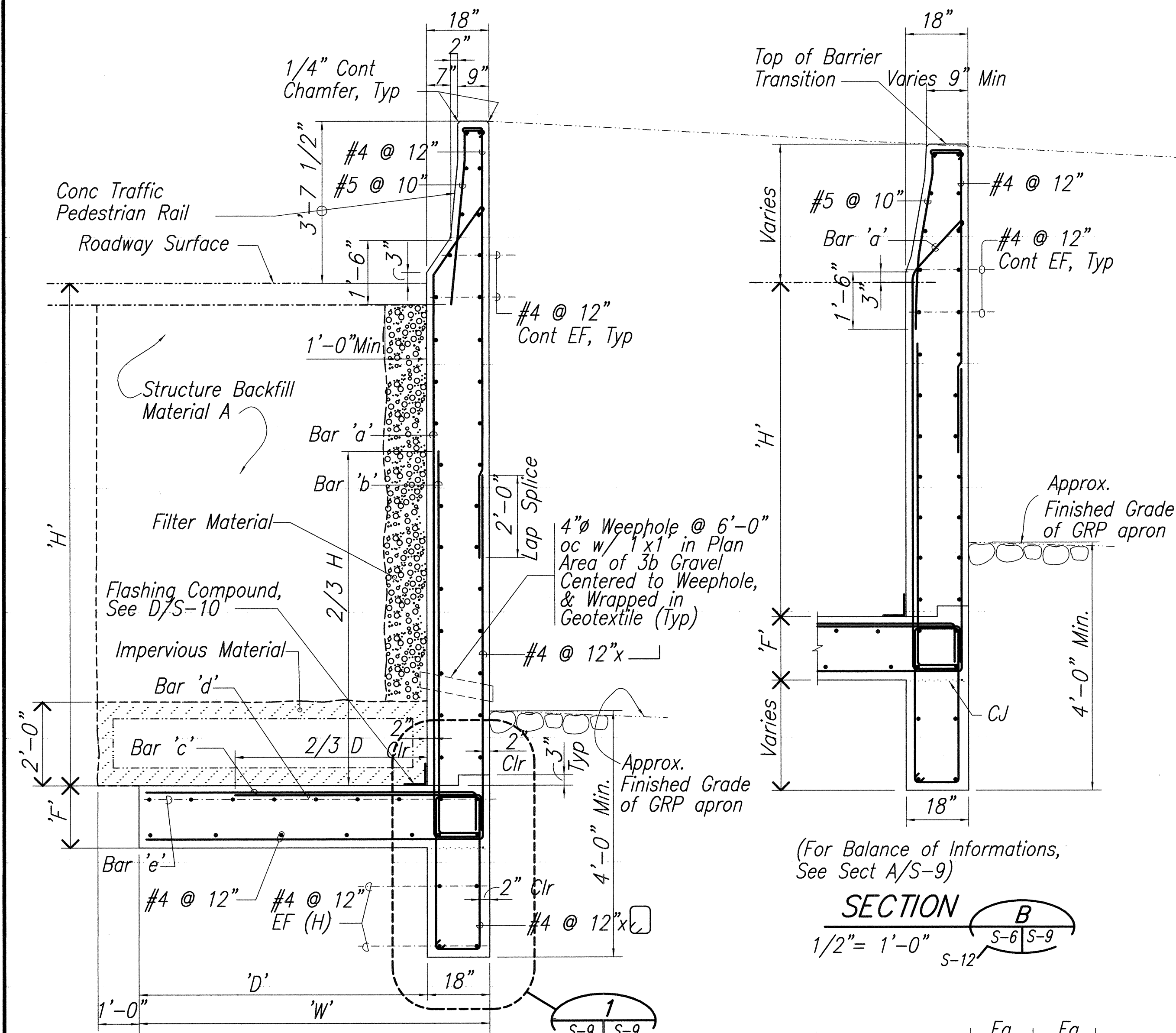
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12/07/05

DATE

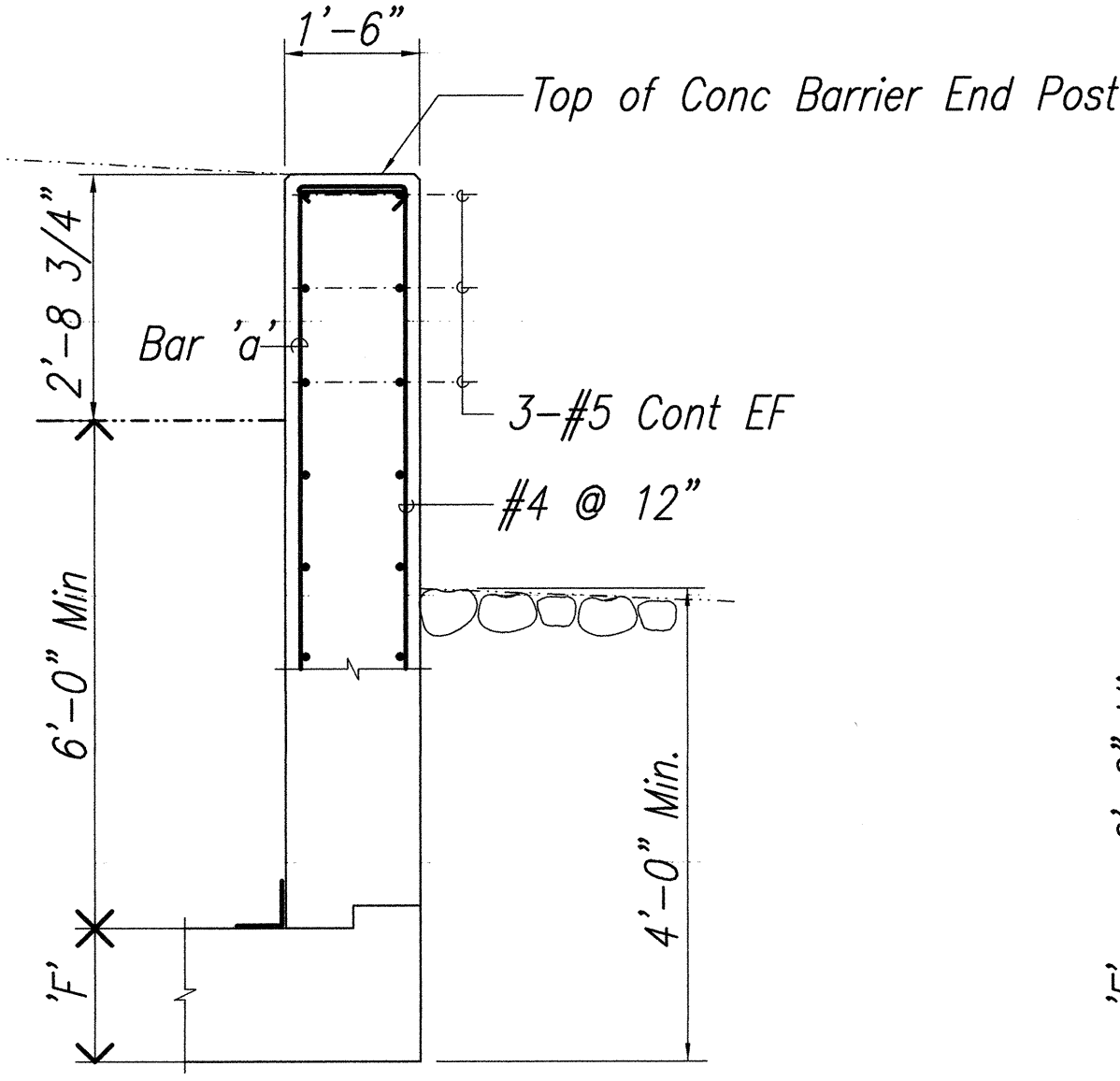
REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT STA. 247+94
HEADWALL DETAILS
MOKULELE HIGHWAY WIDENING
Maui Humane Society
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Scale: as Shown Date: Jun 2005
SHEET No. S-8 OF 14 SHEETS

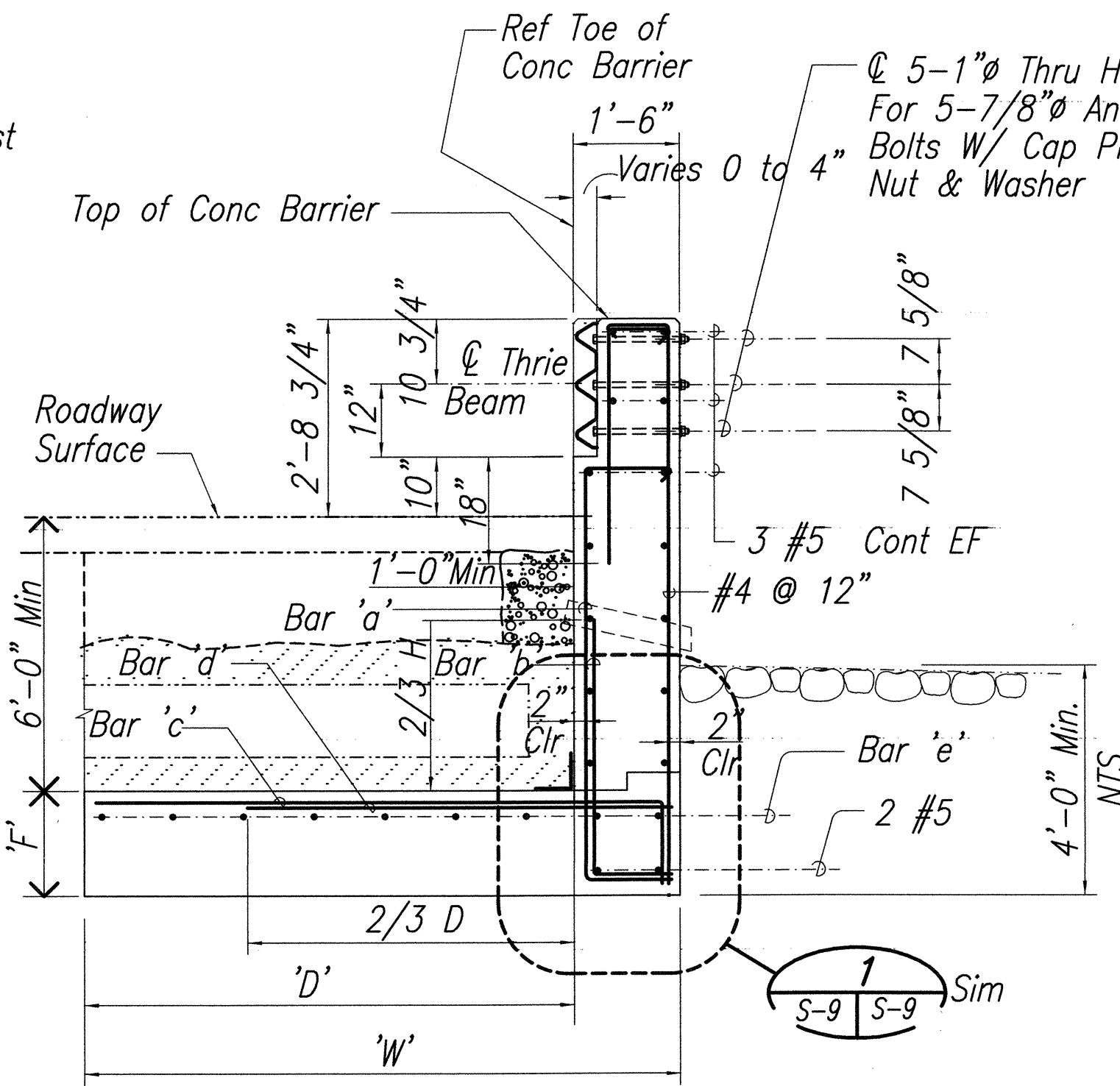


(For Balance of Informations, See Sect A/S-9)

SECTION B
1/2" = 1'-0" S-12



(For Balance of Informations, See Sect A/S-9)

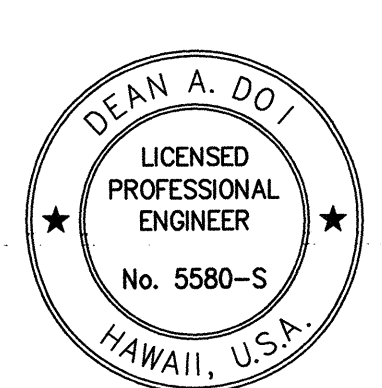


(Same as Sect A/S-9 Except as Noted)

WING WALLS #1 & #2 SCHEDULE						
Design	6'	8'	10'	12'	14'	16'
'F'	1'- 2"	1'- 2"	1'- 4"	1'- 4"	1'- 6"	1'- 10"
'W'	12'- 6"	12'- 6"	12'- 6"	14'- 0"	15'- 6"	19'- 0"
'a' Bars	#5 @ 10"	#5 @ 10"	#5 @ 10"	#6 @ 10"	#6 @ 10"	#6 @ 10"
'b' Bars	#5 @ 20"	#6 @ 20"	#6 @ 10"	#6 @ 10"	#7 @ 10"	#8 @ 10"
'c' Bars	#6 @ 10"	#7 @ 10"	#7 @ 10"	#8 @ 10"	#8 @ 10"	#9 @ 10"
'd' Bars	#6 @ 10"	#7 @ 10"	#7 @ 10"	#8 @ 10"	#8 @ 10"	#9 @ 10"
'e' Bars	12 #5	12 #5	14 #5	14 #5	16 #5	20 #5

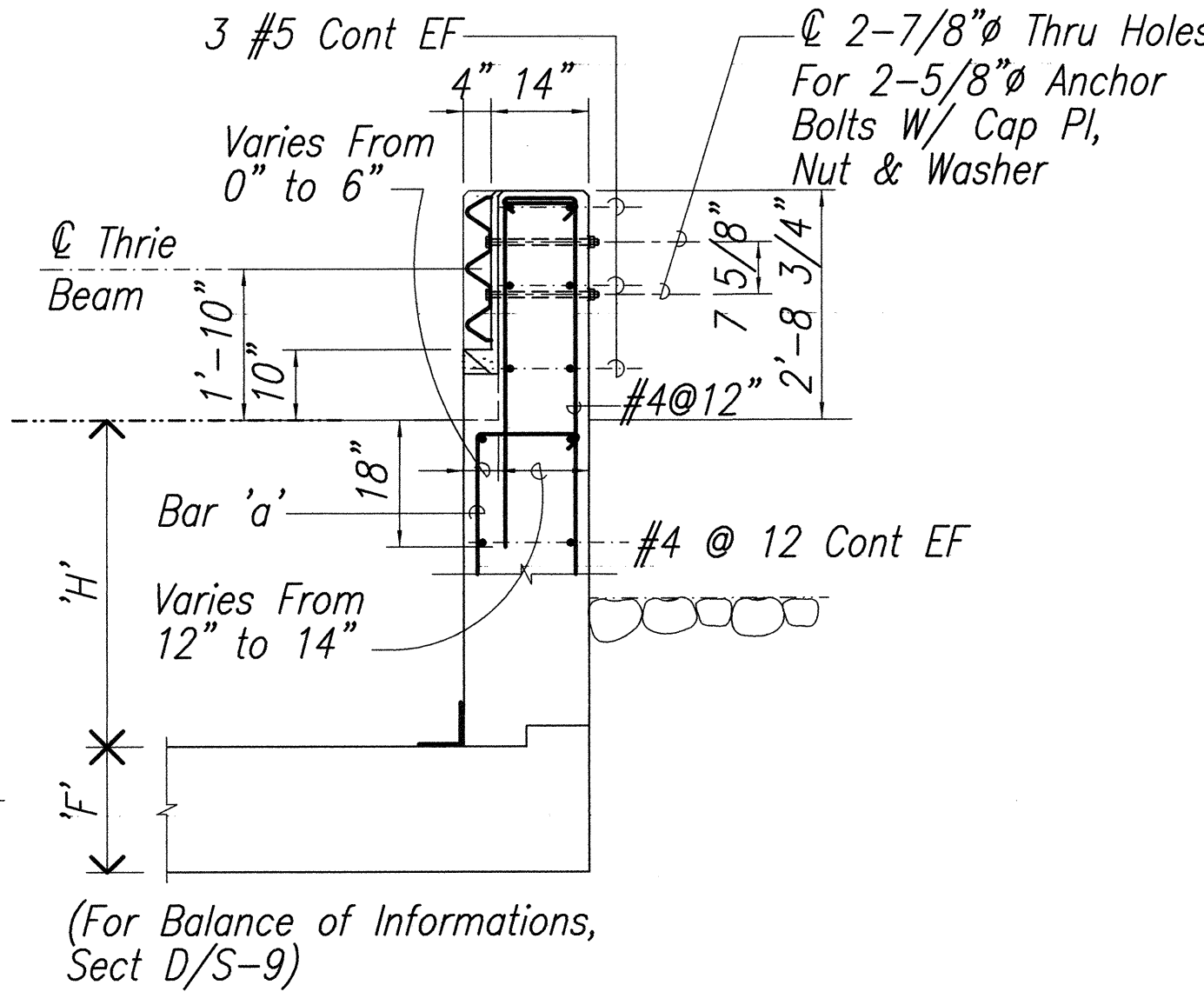
12/07/05 ADDED 4'-0" DIMENSION TO SECTION D

DATE REVISION



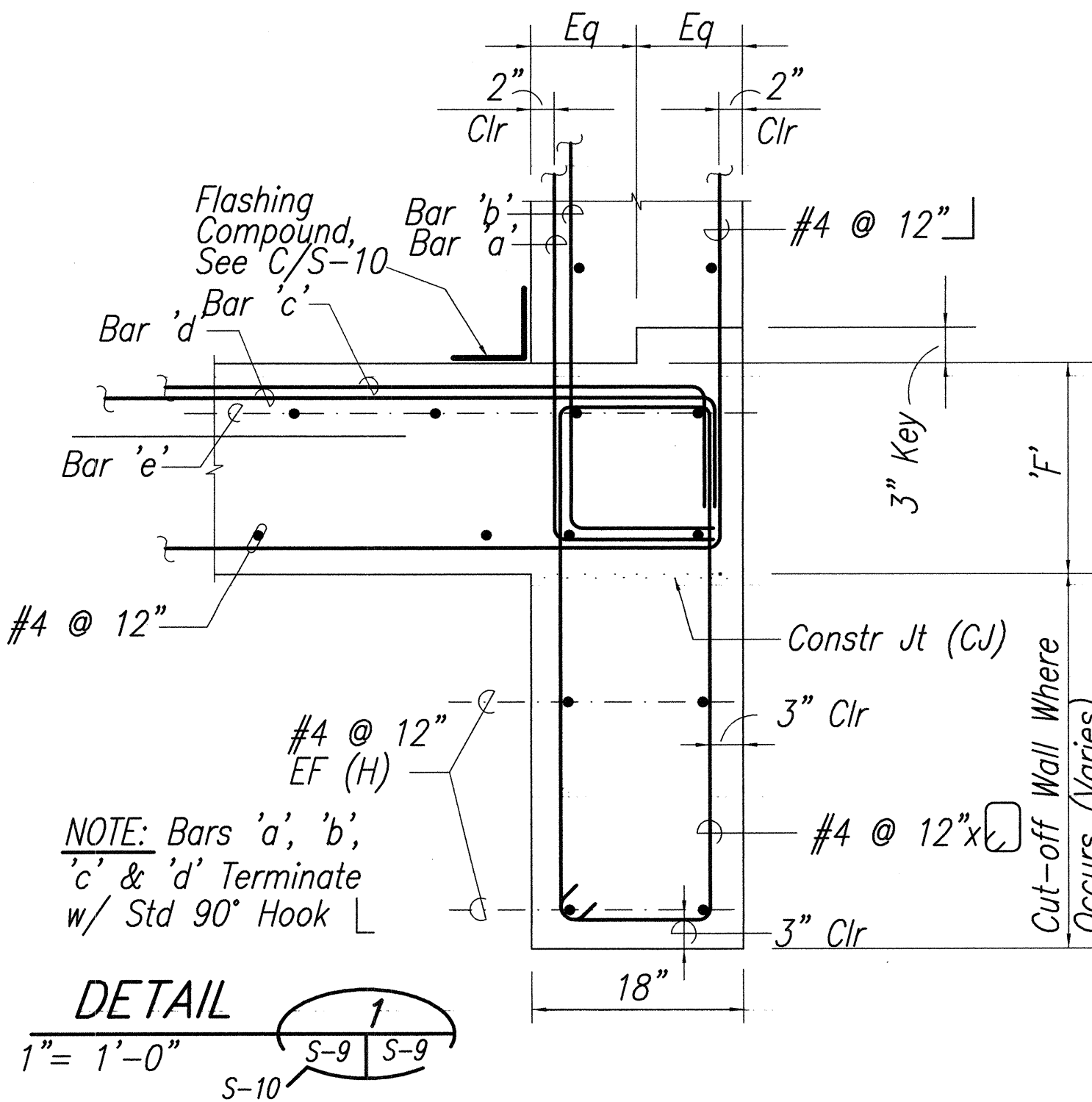
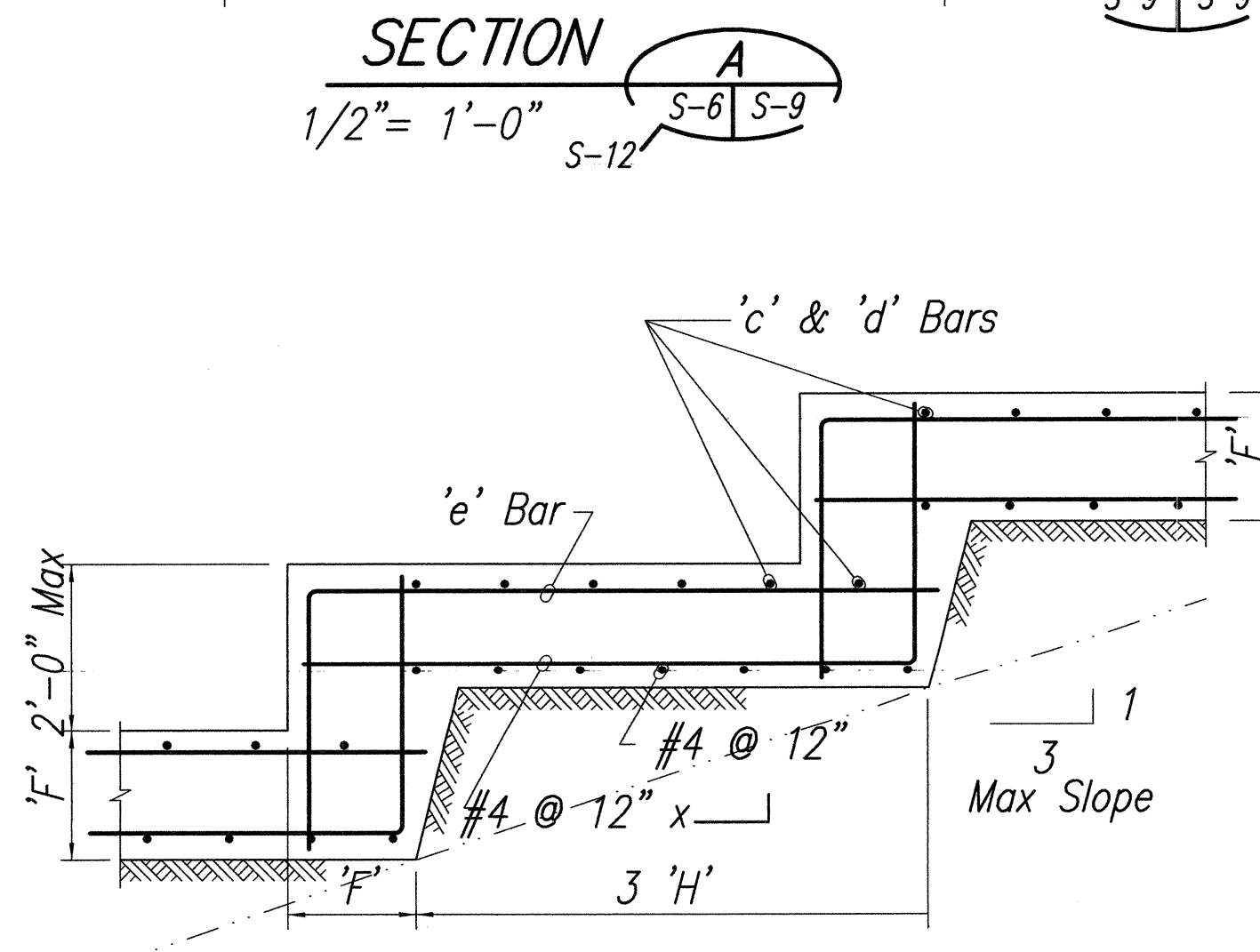
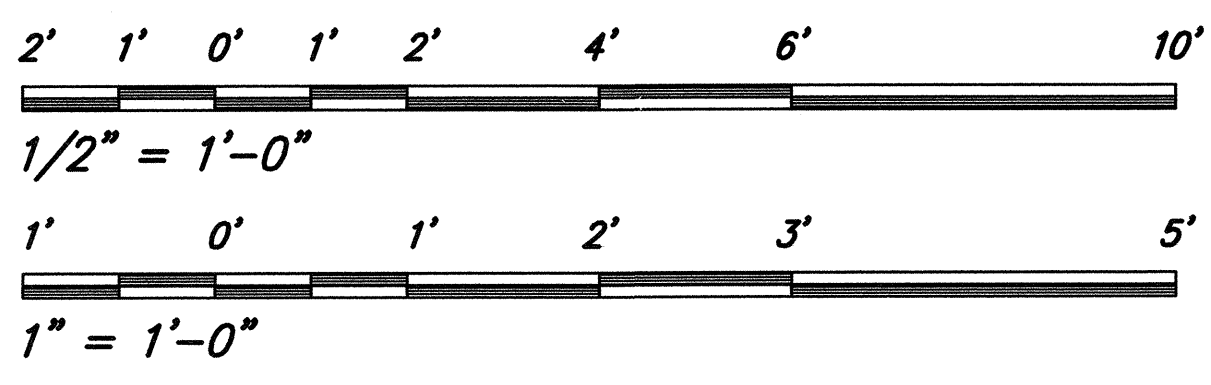
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT STA. 247+94
WING WALLS 1&2 SECTIONS&SCHEDULE
MOKULELE HIGHWAY WIDENING
Maui Humane Society
to
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SHEET No. S-9 OF 14 SHEETS

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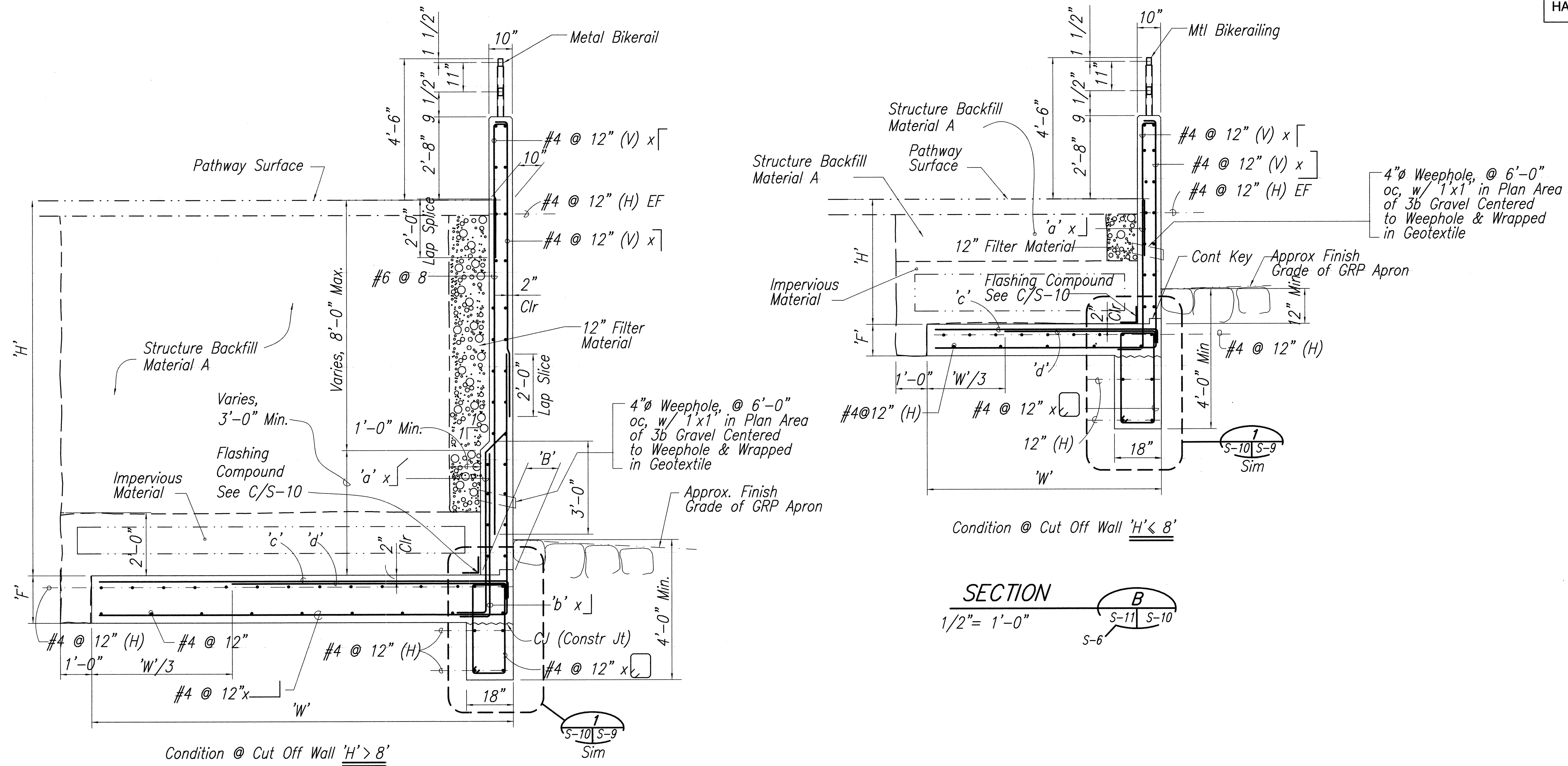
(For Balance of Informations, Sect D/S-9)

GRAPHIC SCALES



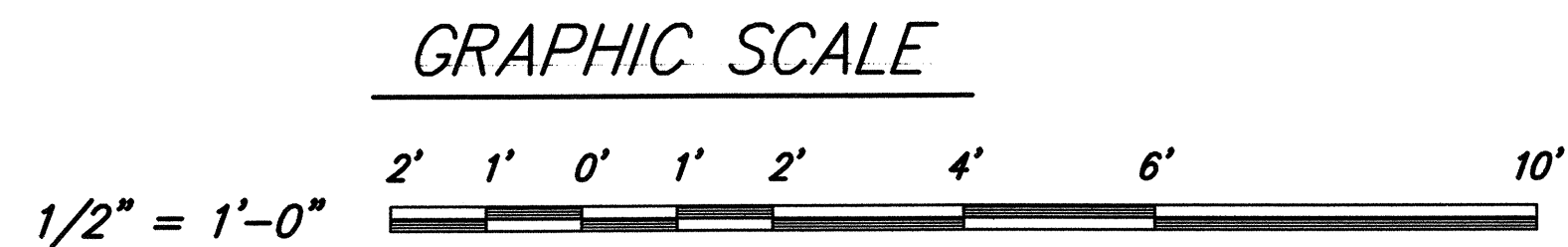
NOTE: Bars 'a', 'b', 'c' & 'd' Terminate w/ Std 90° Hook

SURVEY PLATTED BY
DRAWN BY
CHECKED BY
DATE



SECTION
1/2" = 1'-0"

SECTION
1/2" = 1'-0"



WING WALLS #3 & #4 SCHEDULE							
Desgn 'H'	3'	4'	6'	8'	10'	12'	14'
'F'	1'- 0"	1'- 0"	1'- 0"	1'- 2"	1'- 2"	1'- 4"	1'- 6"
'W'	7'- 6"	7'- 6"	8'- 0"	9'- 0"	9'- 9"	12'- 0"	13'- 6"
'B'	10"	10"	10"	10"	12"	14"	16"
'a' Bars	#4 @ 12	#4 @ 12	#5 @ 12	#6 @ 8	#6 @ 8	#6 @ 10	#6 @ 10
'b' Bars					#6 @ 24	#7 @ 10	#7 @ 10
'c' Bars	#7 @ 12	#7 @ 12	#6 @ 12	#7 @ 12	#8 @ 12	#8 @ 10	#8 @ 10
'd' Bars			#6 @ 12	#7 @ 12	#8 @ 12	#8 @ 10	#8 @ 10

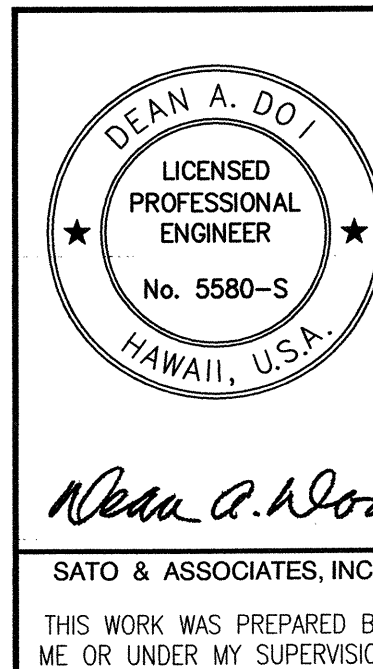
Note:
Flashing Compound for Construction Joint Waterproofing Shall Conform to Requirements of ASTM Specifications D4586 as a Plying Cement in the Construction of Membrane Waterproofing systems With Fabrics Conforming to ASTM Specification D1668 (Asphalt Types) The Product Shall Adhere to Damp Concrete and Masonry Surfaces.

FLASHING COMPOUND WATERPROOFING DETAIL

NO SCALE

SECTION
1/2" = 1'-0"

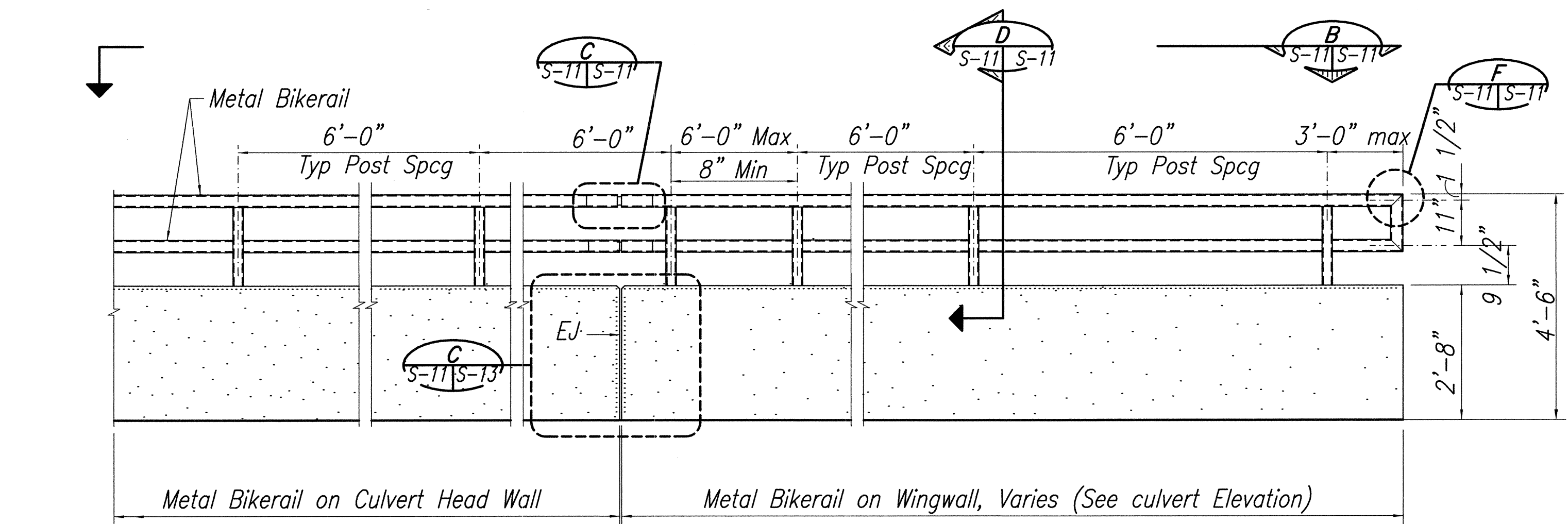
- ① Clean Concrete Surface Before Application of 1st Coat of Flashing Compound
- ② 2nd Layer Fabric, See Specs
- ③ Finish Coat w/ Flashing Compound



12/07/05	REVISED SECTION A
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION BOX CULVERT STA. 247+94 WING WALLS 3&4 SECTIONS SCHEDULE MOKULELE HIGHWAY WIDENING Maui Humane Society to Vicinity of Kolaloa Bridge Federal-Aid Project No. NH-A311 (6)R Scale: as Shown Date: Jun 2005 SHEET No. S-10 OF 14 SHEETS	

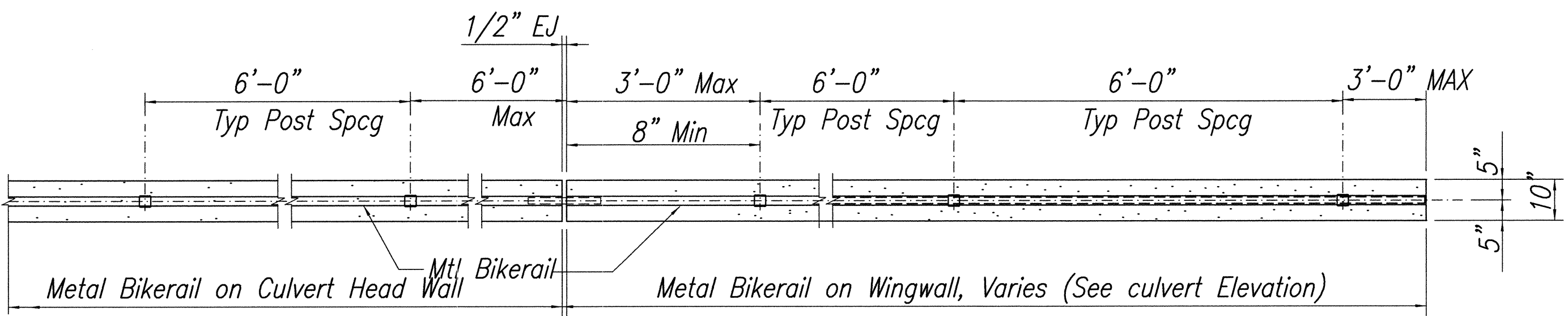
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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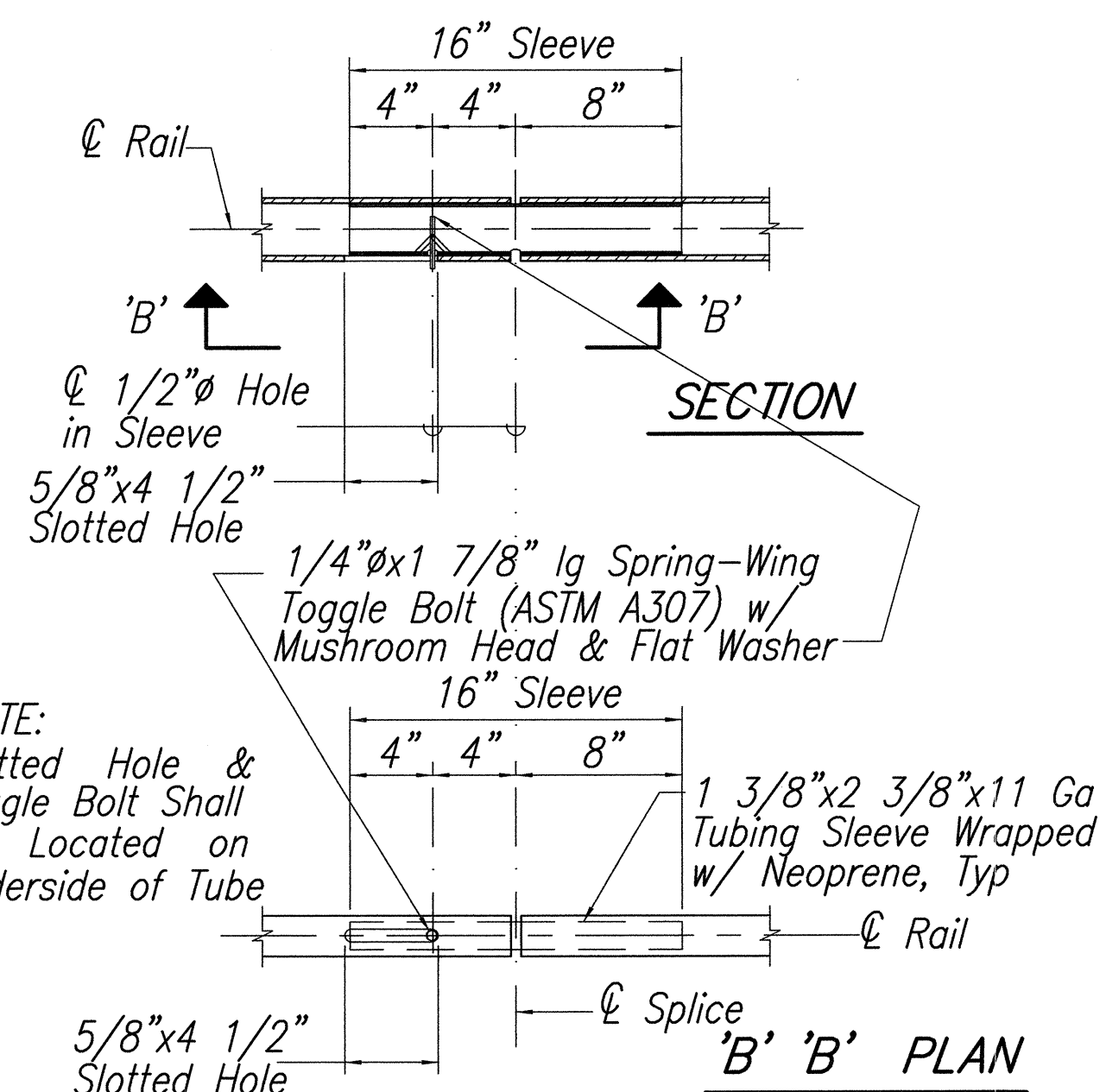
BIKERAIL - ELEVATION

1/2" = 1'-0"



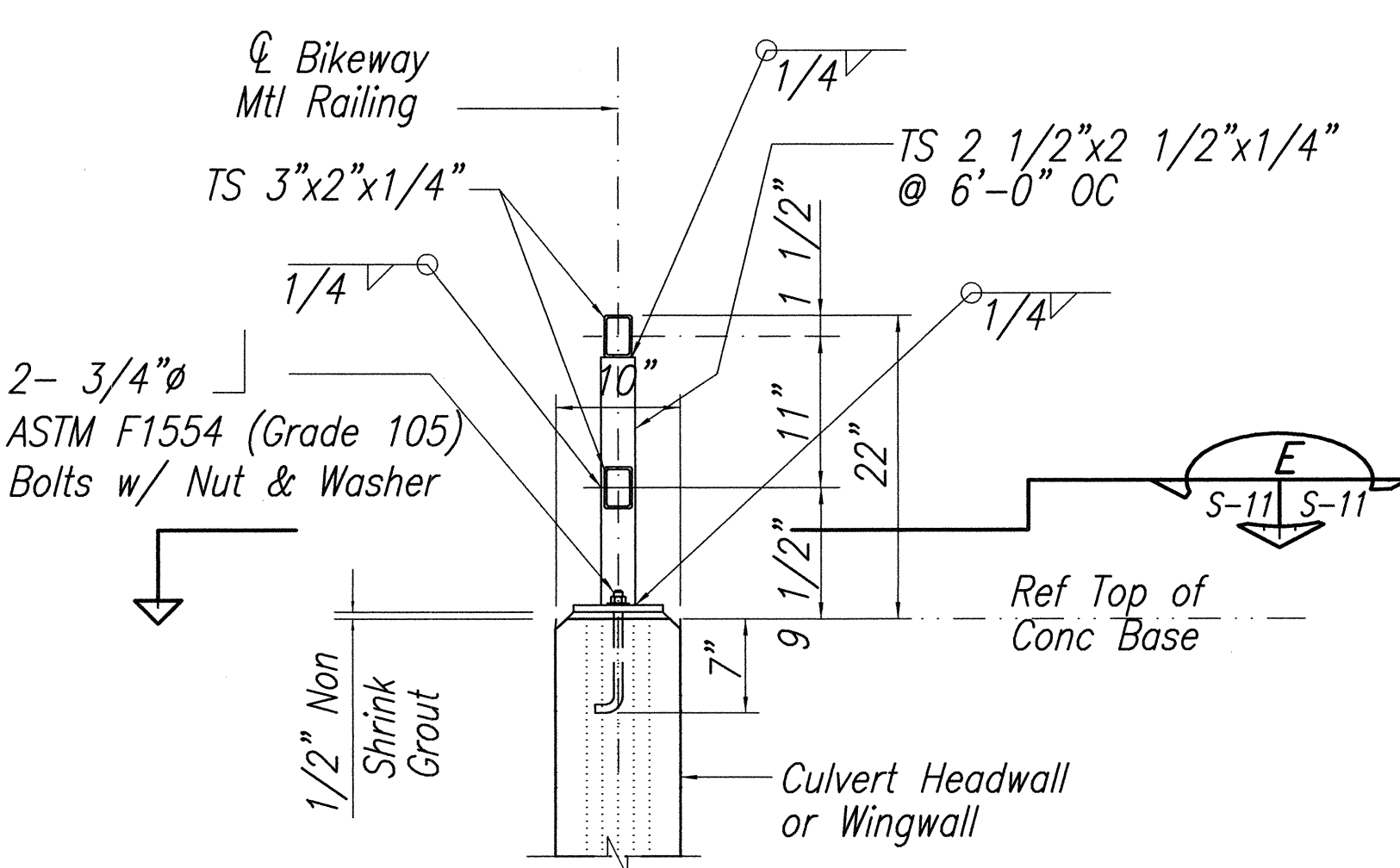
BIKERAIL - TOP VIEW

1/2" = 1'-0"



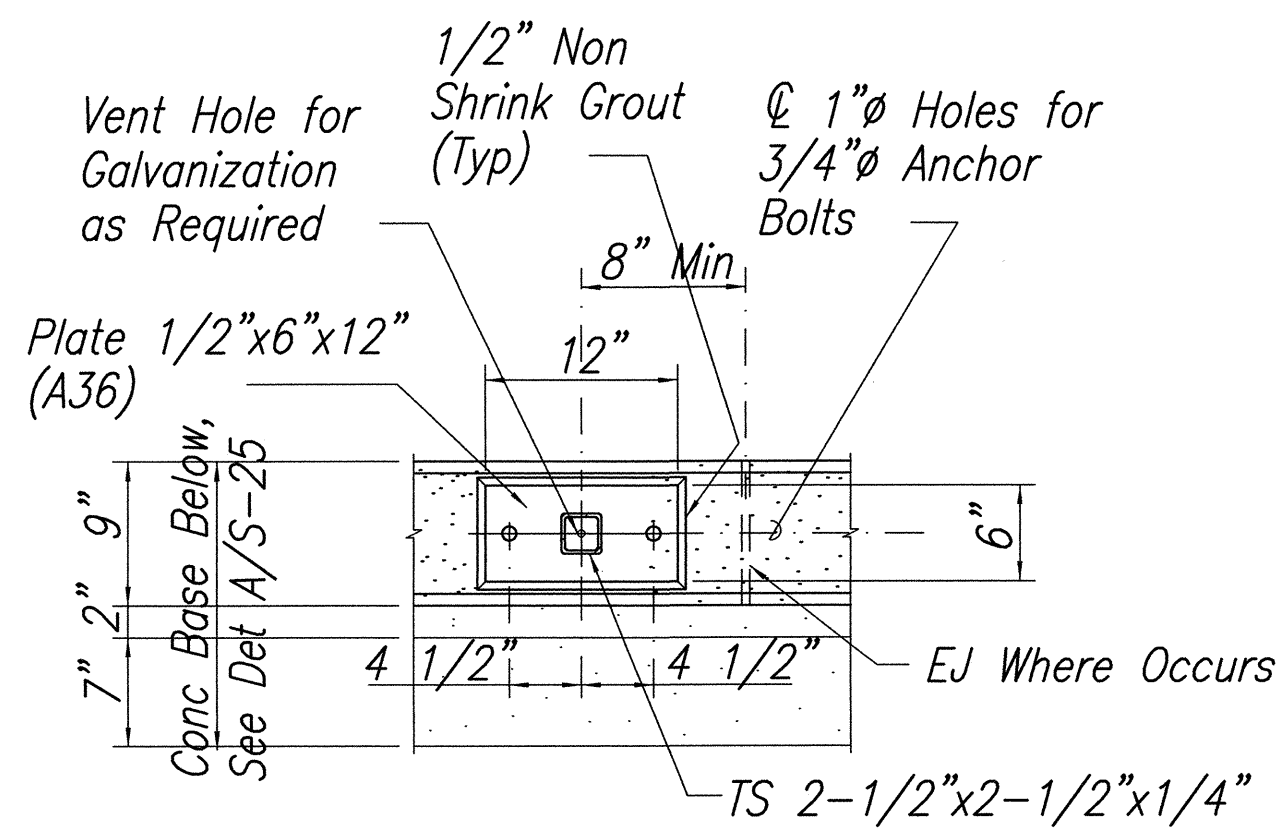
TYPICAL TUBE SPLICE DETAILS

1 1/2" = 1'-0"



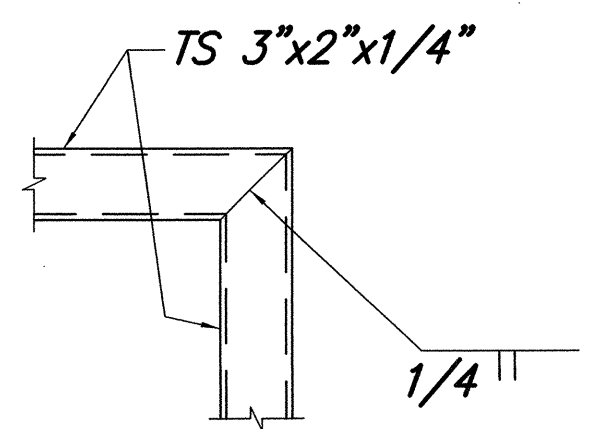
BIKEWAY RAILING DETAIL

1" = 1'-0"



ANCHOR PLATE FOR BIKERAIL

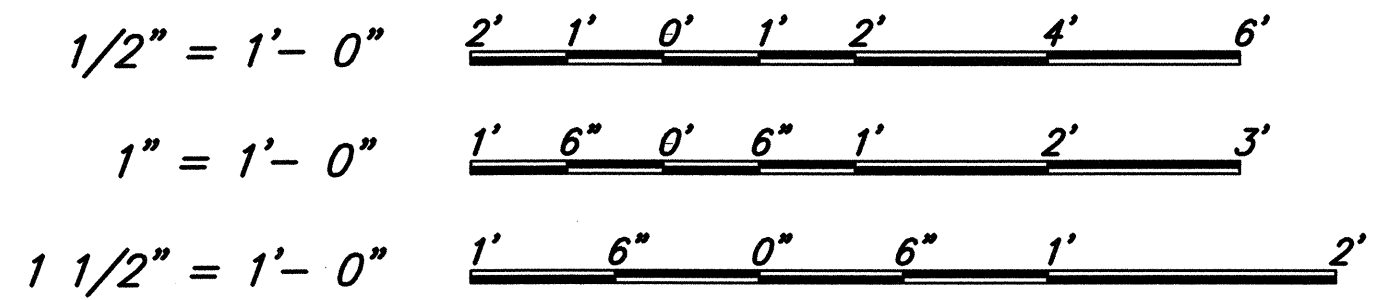
1" = 1'-0"



TYPICAL TUBE CONNECTION DETAIL

1 1/2" = 1'-0"

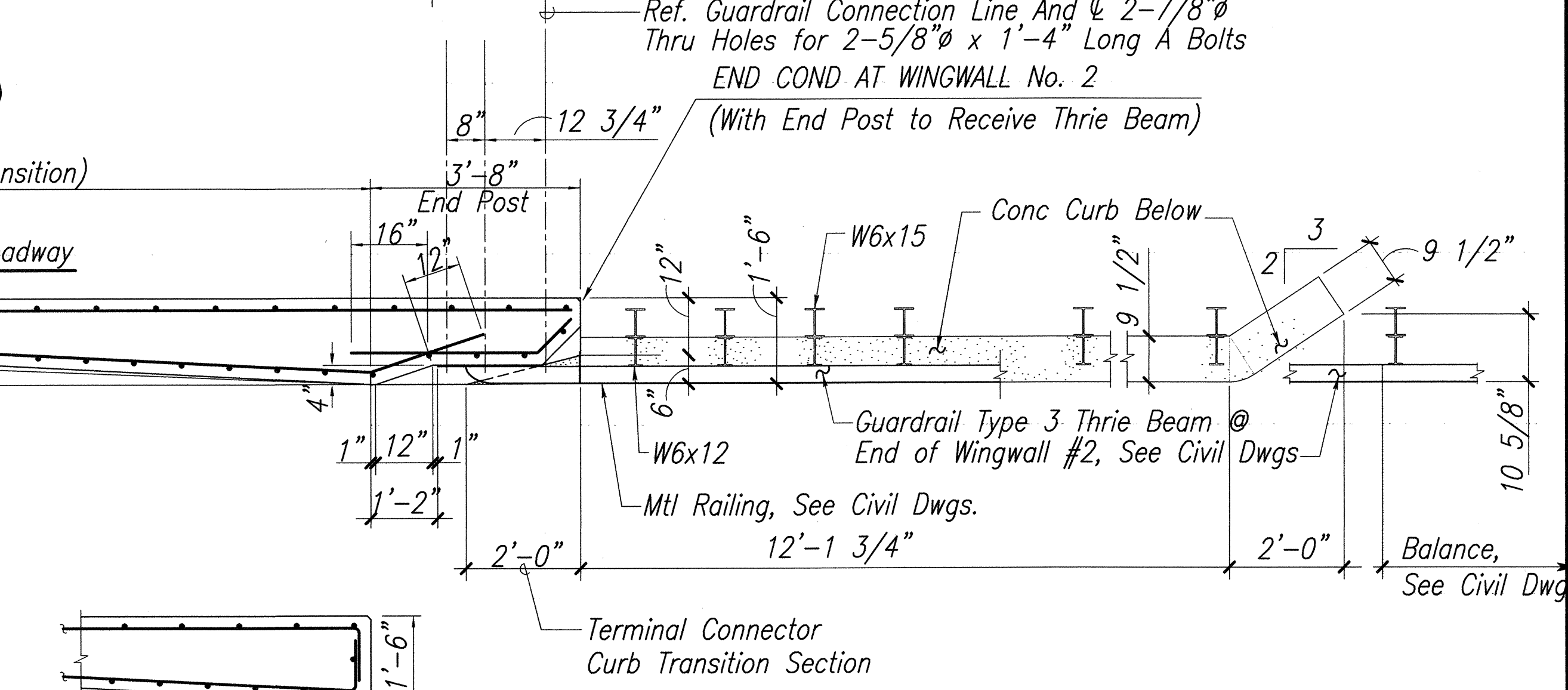
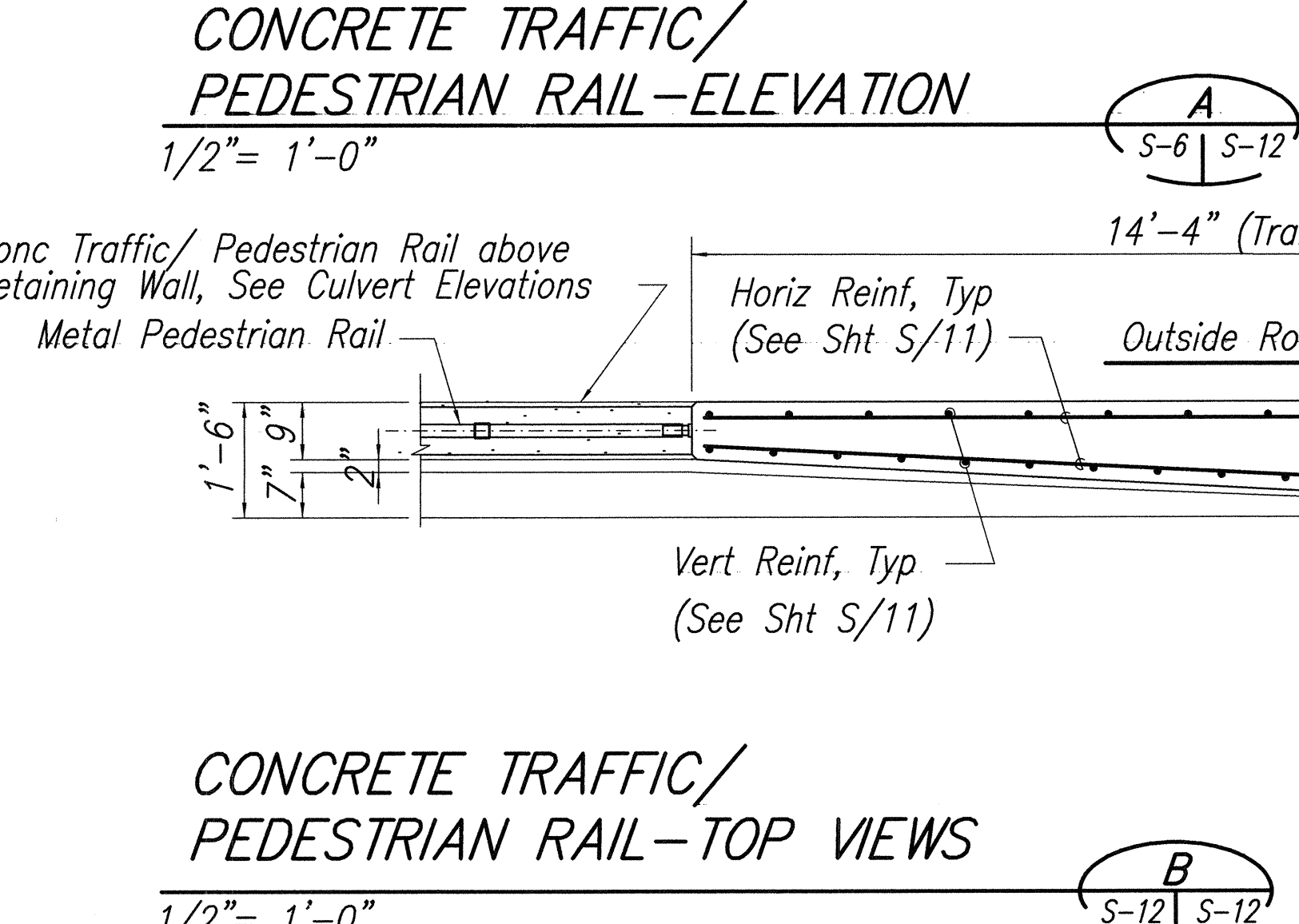
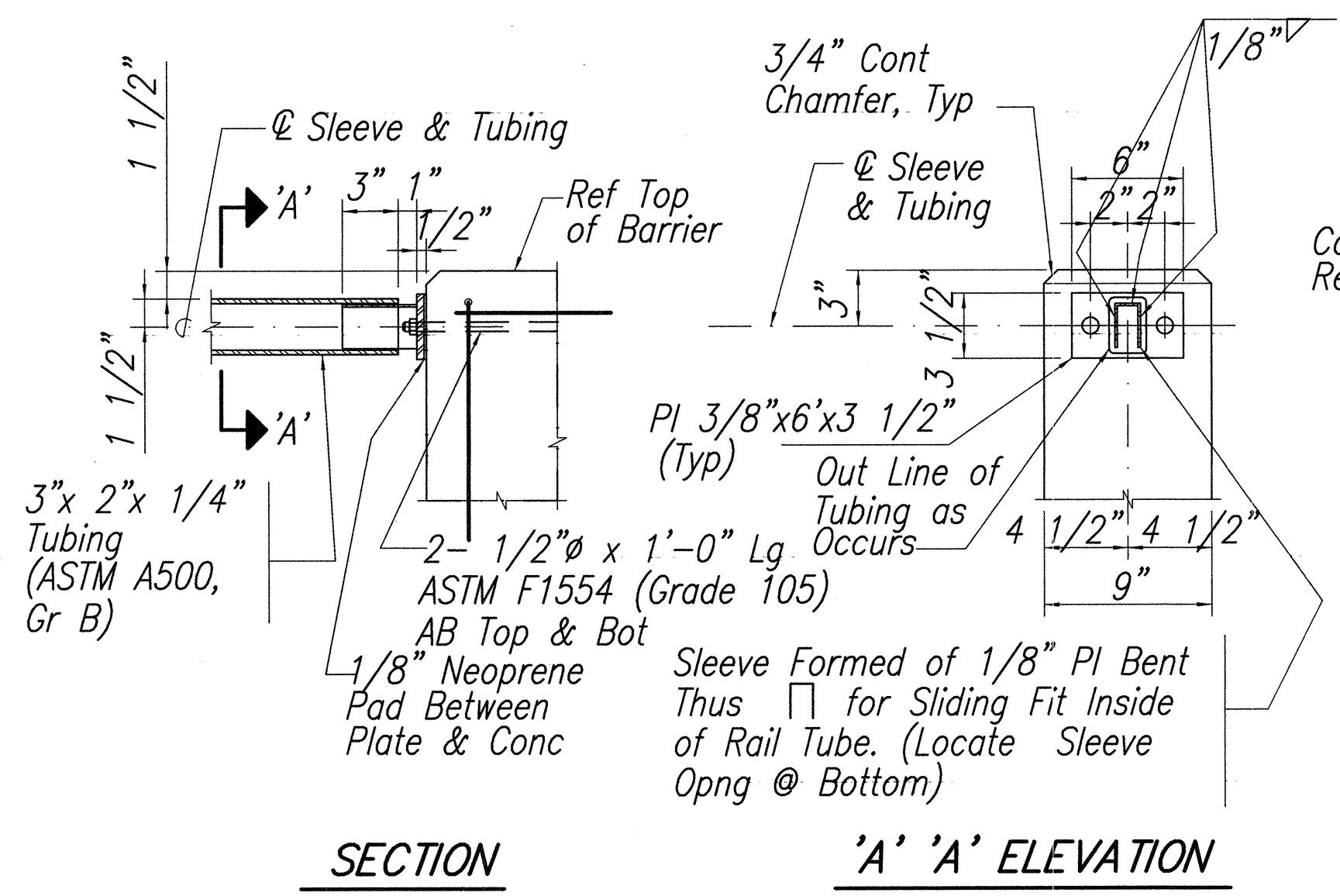
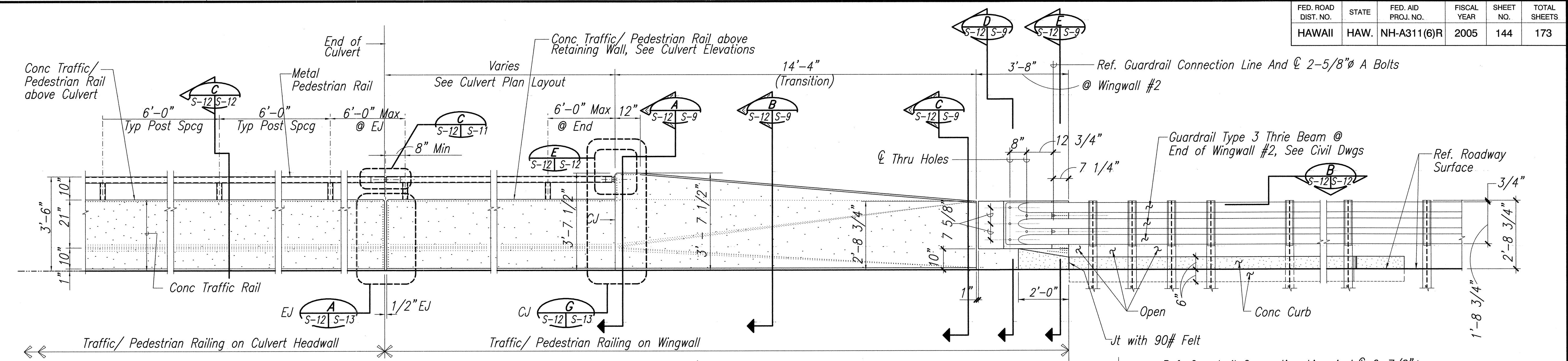
GRAPHIC SCALES



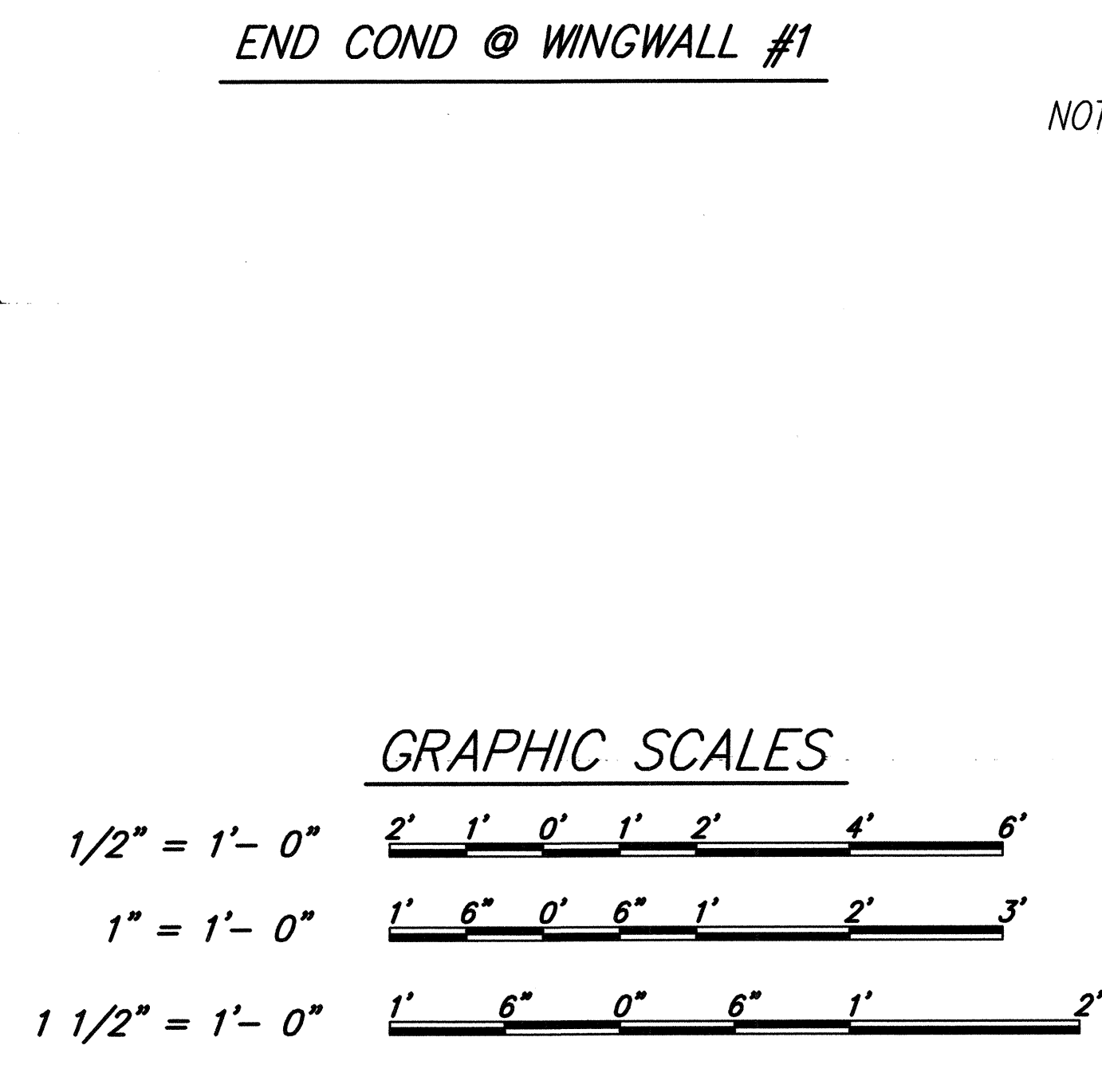
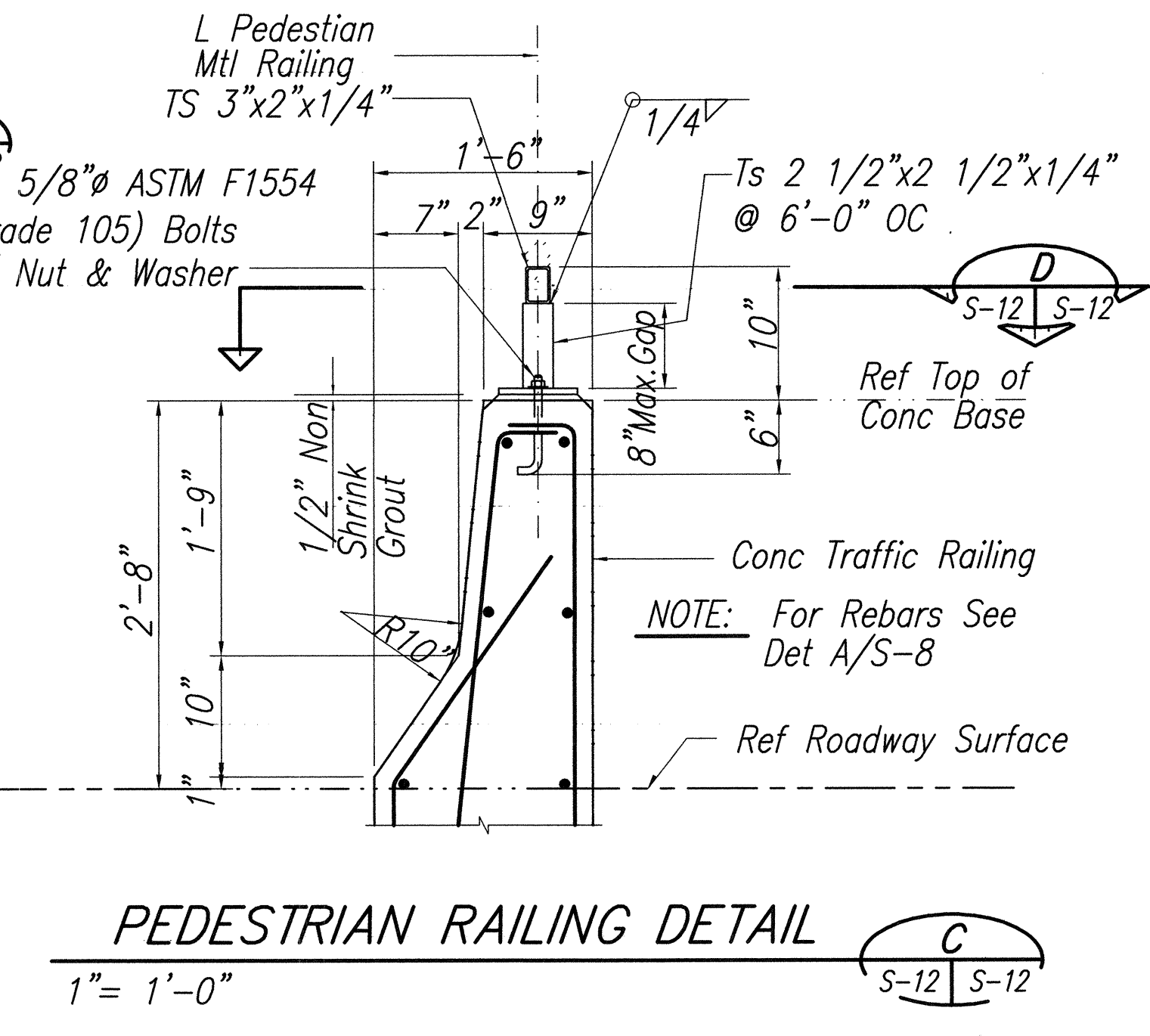
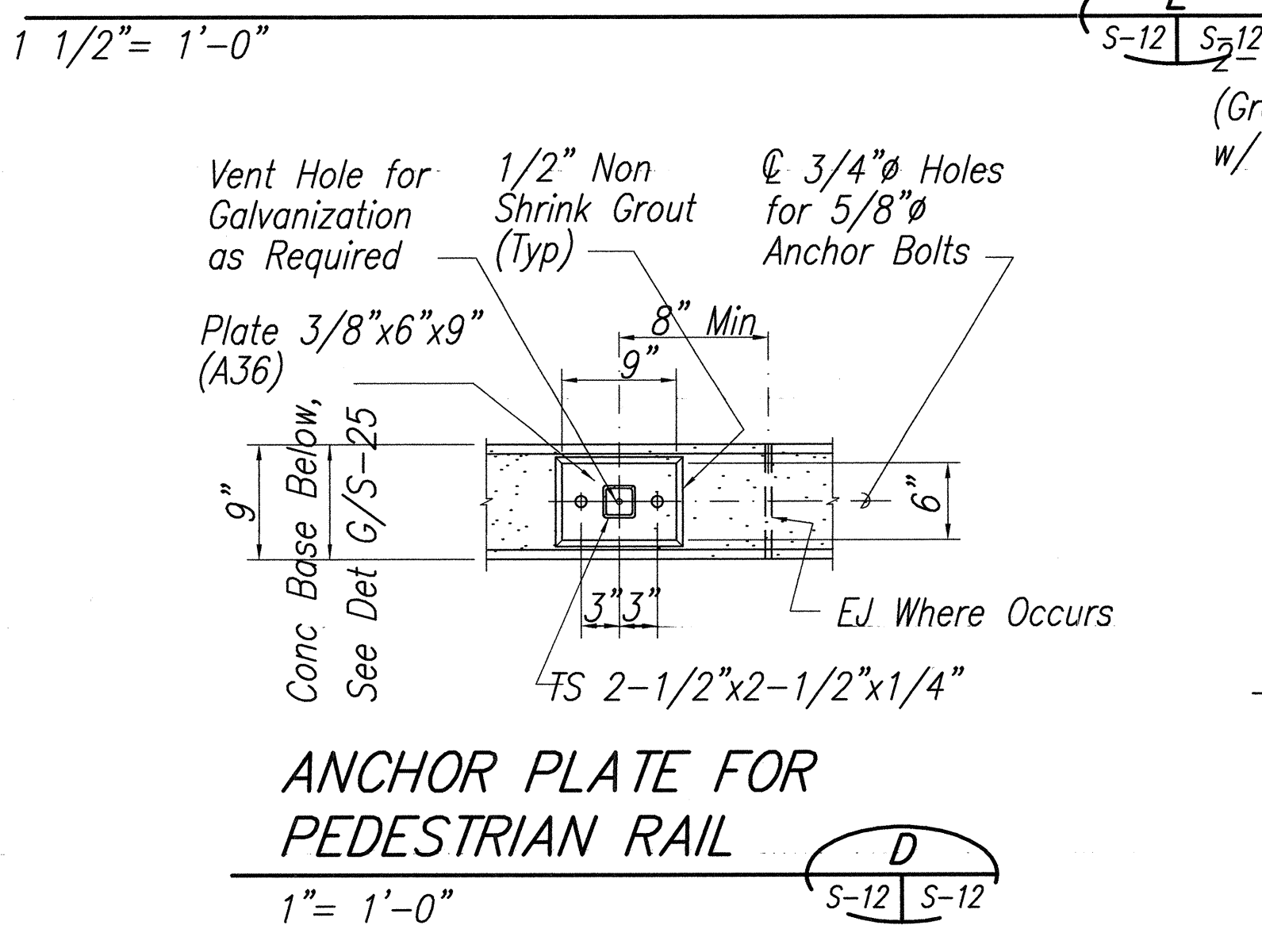
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOX CULVERT STA. 247+94
WING WALLS 3&4 ELEVATIONS
MOKULELE HIGHWAY WIDENING
Maui Humane Society
to
Vicinity of Kolaloa Bridge
Federal-Aid Project No. NH-A311 (6)R
Scale: as Shown Date: Jun 2005
SHEET No. S-11 OF 14 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-A311(6)R	2005	144	173



TYPICAL RAIL SLEEVE ANCHOR AT CONCRETE WING WALL CONNECTION DETAILS



- NOTE: 1. Curb to be in line w/ front face of metal guardrail & match front face of end post at tapered end.
2. Curb transition section shall be cast monolithically with the end post.

DATE	REVISION
12/07/05	REVISED ELEVATION A
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION BOX CULVERT STA. 247+94 WING WALLS 1&2 ELEVATIONS&DETAILS MOKULELE HIGHWAY WIDENING Maui Humane Society to Vicinity of Kolaloa Bridge Federal-Aid Project No. NH-A311 (6)R Scale: as Shown Date: Jun 2005 SHEET No. S-12 OF 14 SHEETS	

DEAN A. DOI
 LICENSED PROFESSIONAL ENGINEER
 No. 5580-S
 HAWAII, U.S.A.
 Sato & Associates, Inc.
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

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

