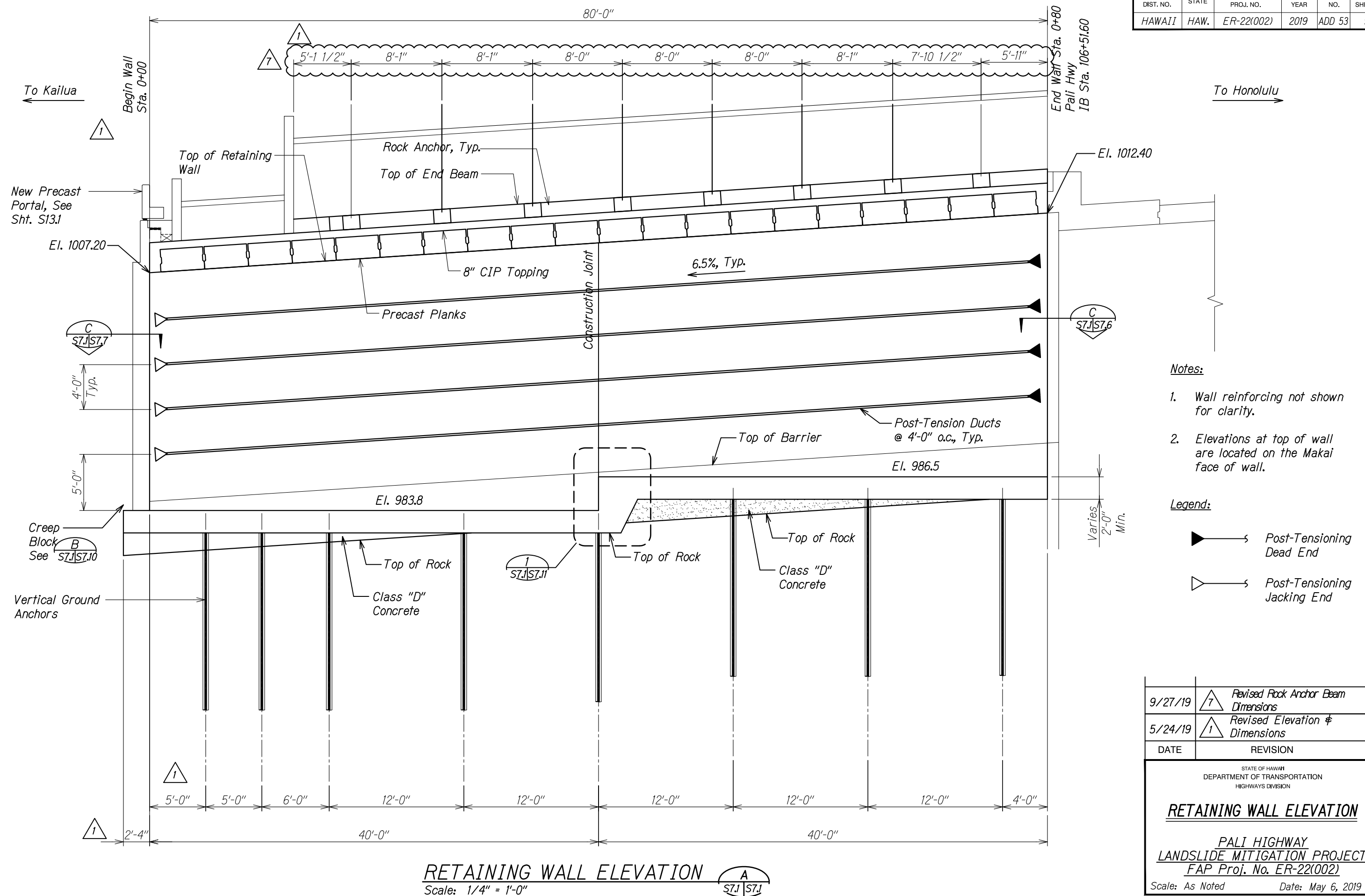




FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	ADD 53	94



9/27/19		Revised Rock Anchor Beam Dimensions
5/24/19		Revised Elevation & Dimensions
DATE	REVISION	

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

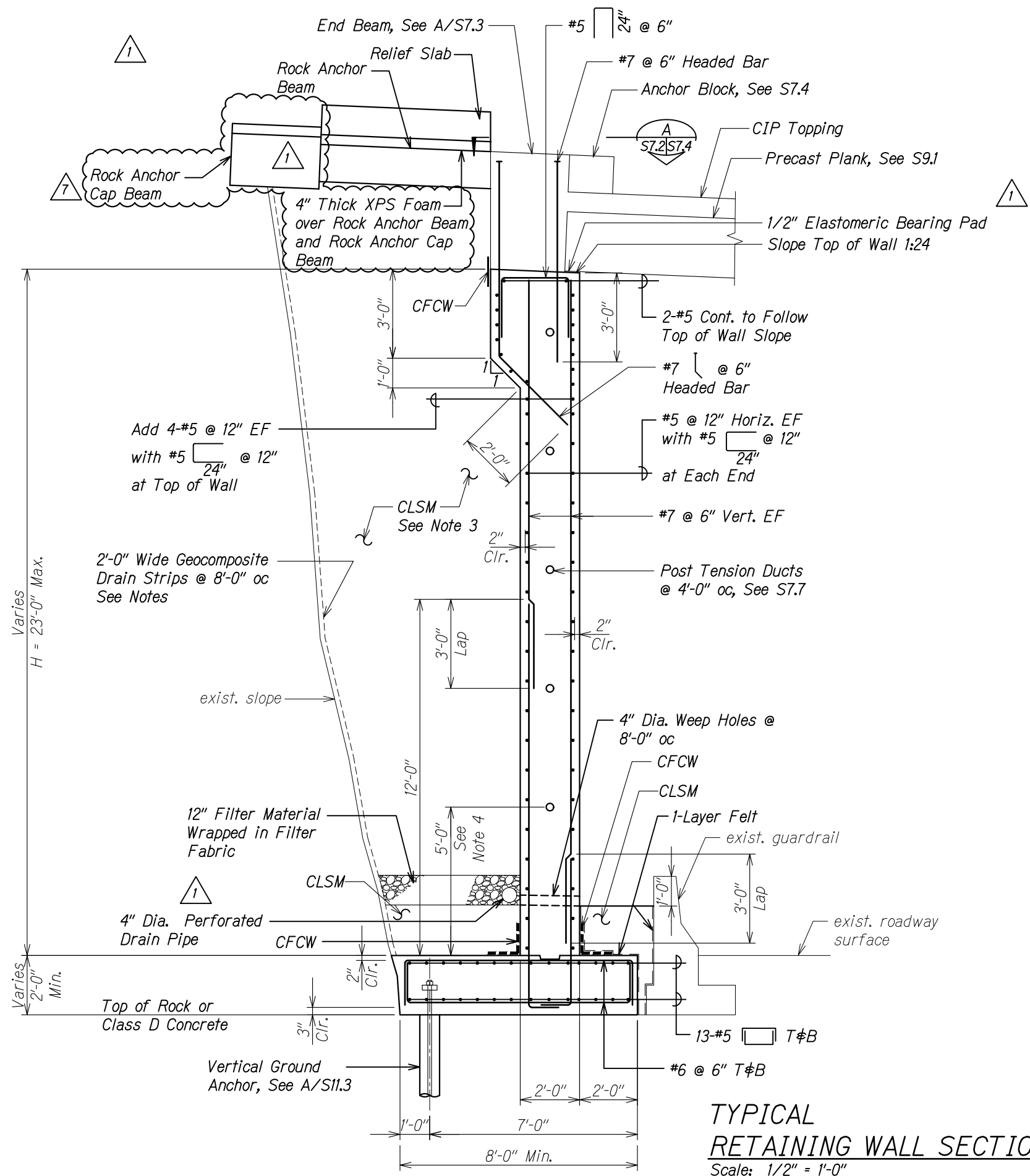
**RETAINING WALL ELEVATION**

**PALI HIGHWAY**  
**LANDSLIDE MITIGATION PROJECT**  
**FAP Proj. No. ER-22(002)**

Scale: As Noted      Date: May 6, 2019



SHEET No. *57.1* OF 11 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	ADD 54	94



- Notes:**
1. Place geotextile cover fabric against ground.
  2. Continuously tape all edges of geotextile drain
  3. Lift heights for CLSM pour shall be limited to 4'-0\".
  4. See Sheet S7.1 for post-tension duct layout.

**TYPICAL  
RETAINING WALL SECTION**  
Scale: 1/2\" = 1'-0\"  
A  
S7.10 | S7.2

9/27/19		Added Rock Anchor Cap Beam
5/24/19		Revised Detail
DATE	REVISION	

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**TYPICAL**

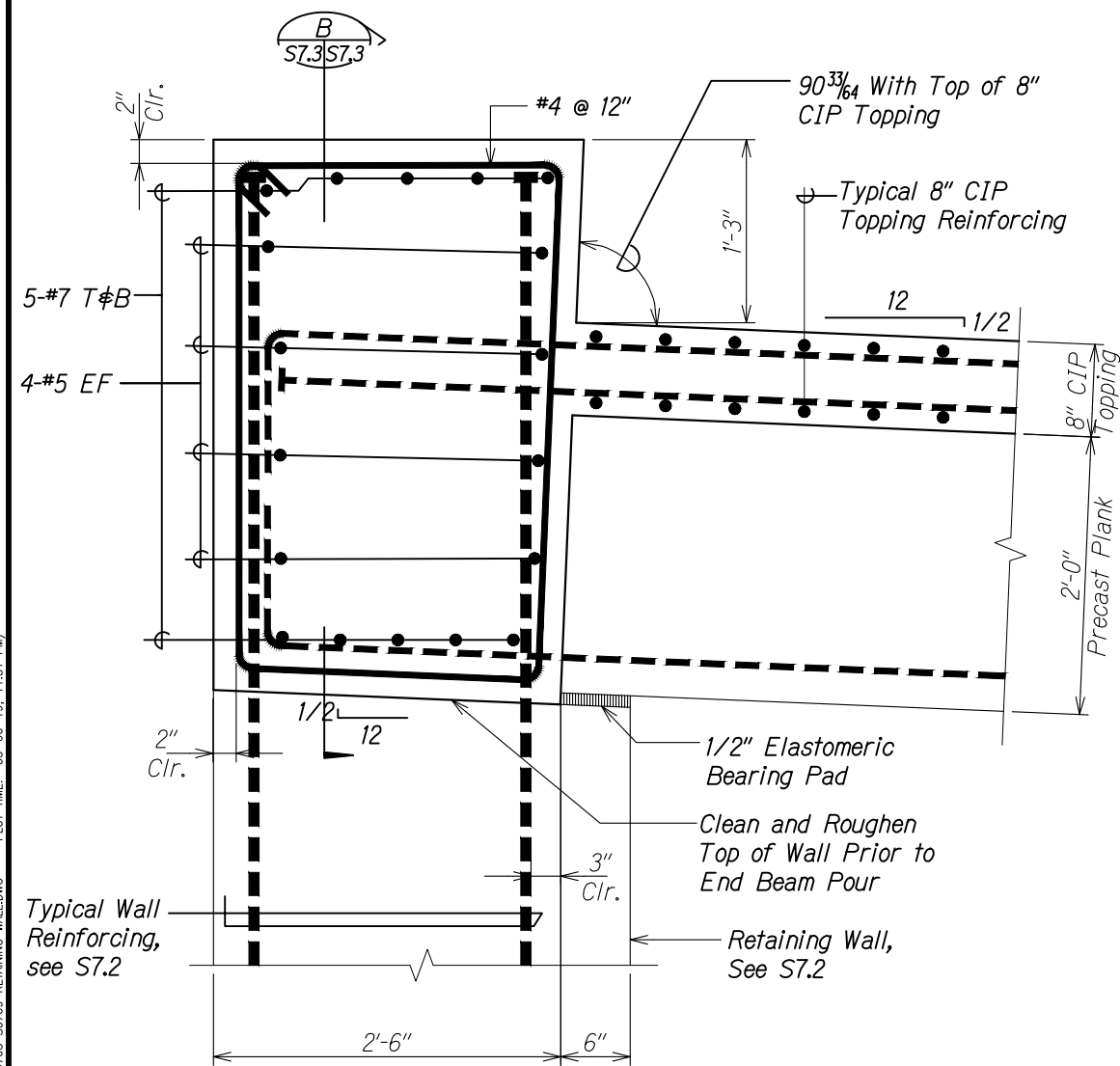
**RETAINING WALL SECTION**

**PALI HIGHWAY**  
**LANDSLIDE MITIGATION PROJECT**  
**FAP Proj. No. ER-22(002)**

Scale: As Noted      Date: May 6, 2019

SHEET No. **S7.2** OF **11** SHEETS

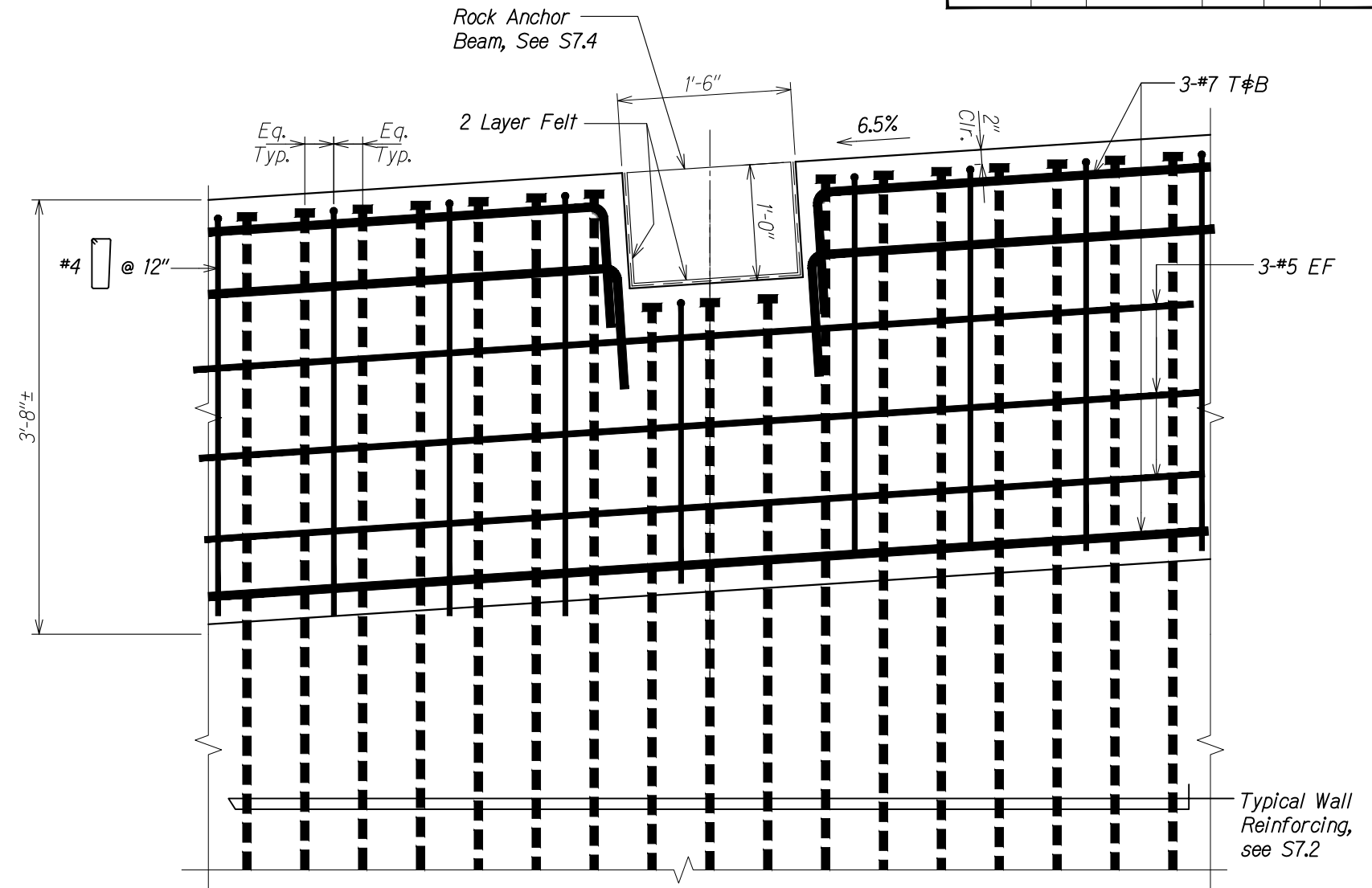
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	55	94



END BEAM SECTION

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

Diagram showing a cross-section of a beam with a circular hole. The hole is labeled 'A' and has a diameter of 15.5 inches. The beam has a total width of 17.3 inches. The distance from the center of the hole to the right edge of the beam is 1.6 inches.



END BEAM ELEVATION   
Scale: 1 1/2" = 1'-0"

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

DRAWING NAME: Z:\00 ONGOING\19-014.1 PALL ROOF SHED-WSP.TIA\01 CAD\05-06-19 TOP\PLM-S0703-S0705 S0709 RETAINING WALL DWG PLOT TIME: 05-06-19 11:51 PM)

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

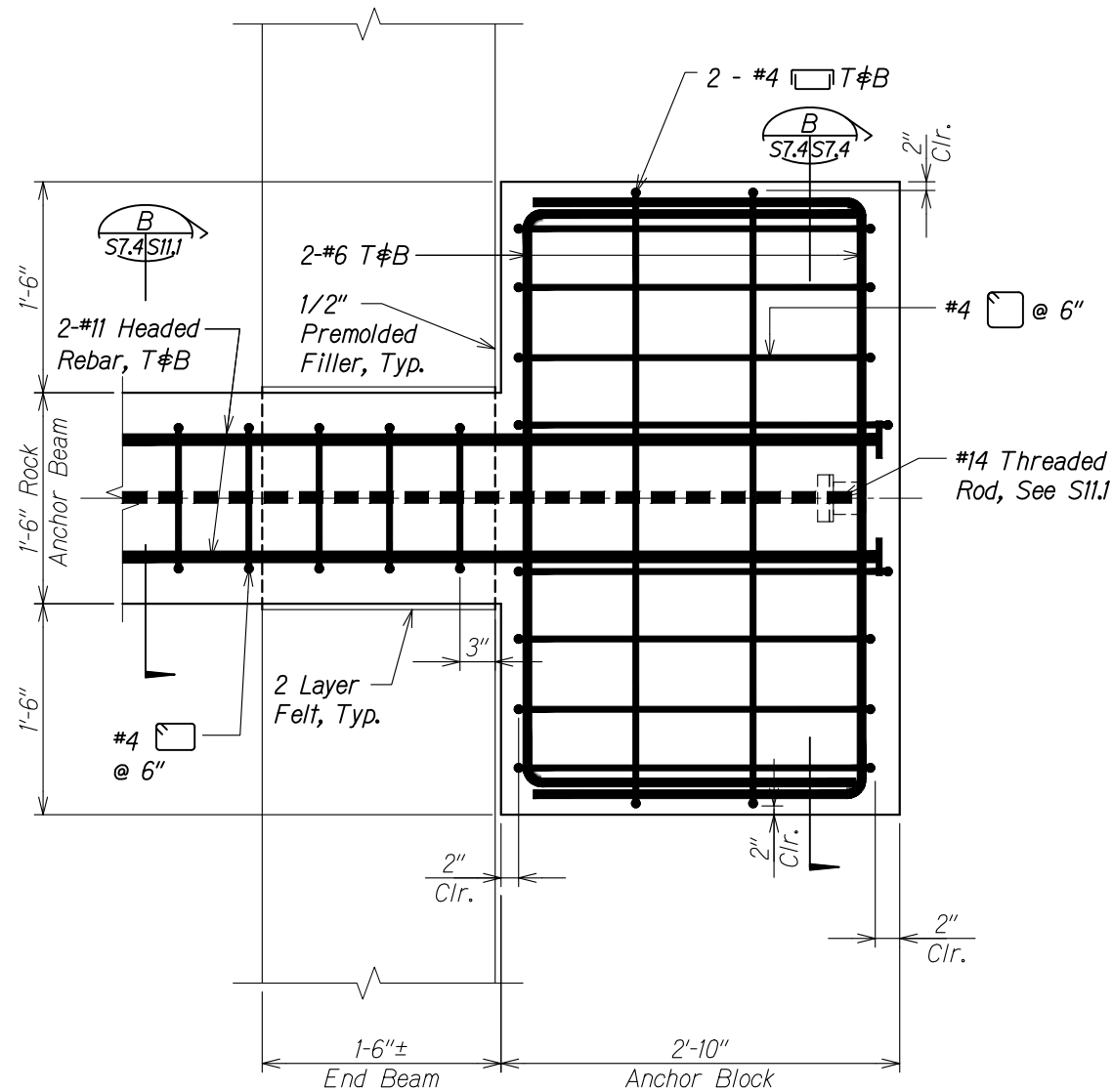
*SECTIONS*

*PALI HIGHWAY*  
*LANDSLIDE MITIGATION PROJECT*  
*FAP Proj. No. ER-22(002)*

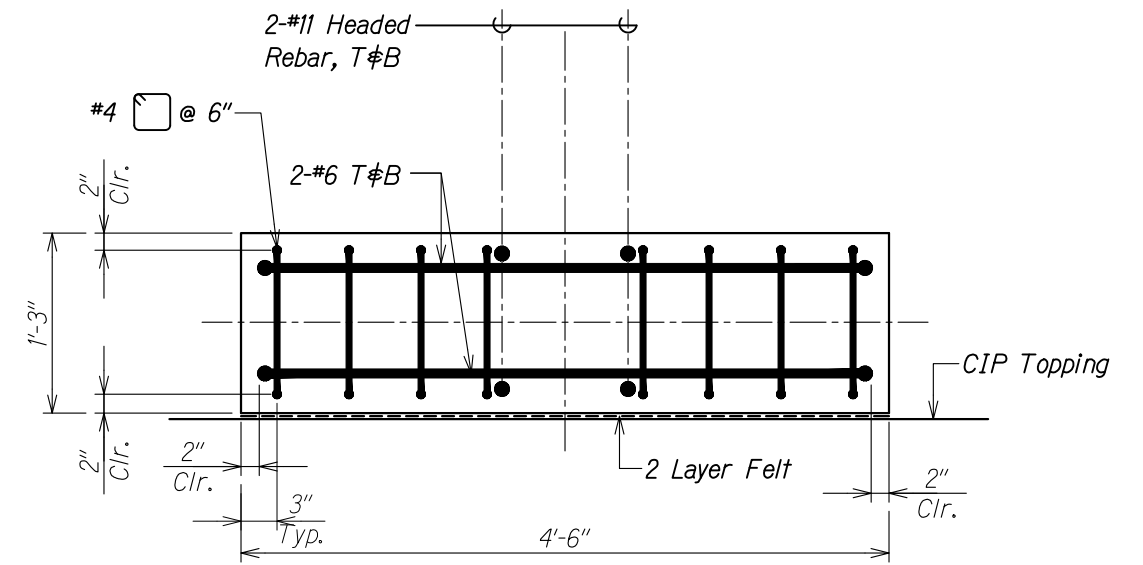
*Scale: As Noted*      *Date: May 6, 2019*


SHEET No. *S7.3* OF *11* SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	56	94



ROCK ANCHOR BEAM PARTIAL PLAN



ANCHOR BLOCK SECTION 

Scale:  $1\frac{1}{2}'' = 1'-0''$

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

DRAWING NAME: Z:\00 ONGOING\19-014.1 PALI ROOF SHED-WSP TM\01 CAD\05-06-19 TOPO\PLM-S0703-S0705 S0709 RETAINING WALL.DWG PLOT TIME: 05-06-19, 11:51 PM)

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

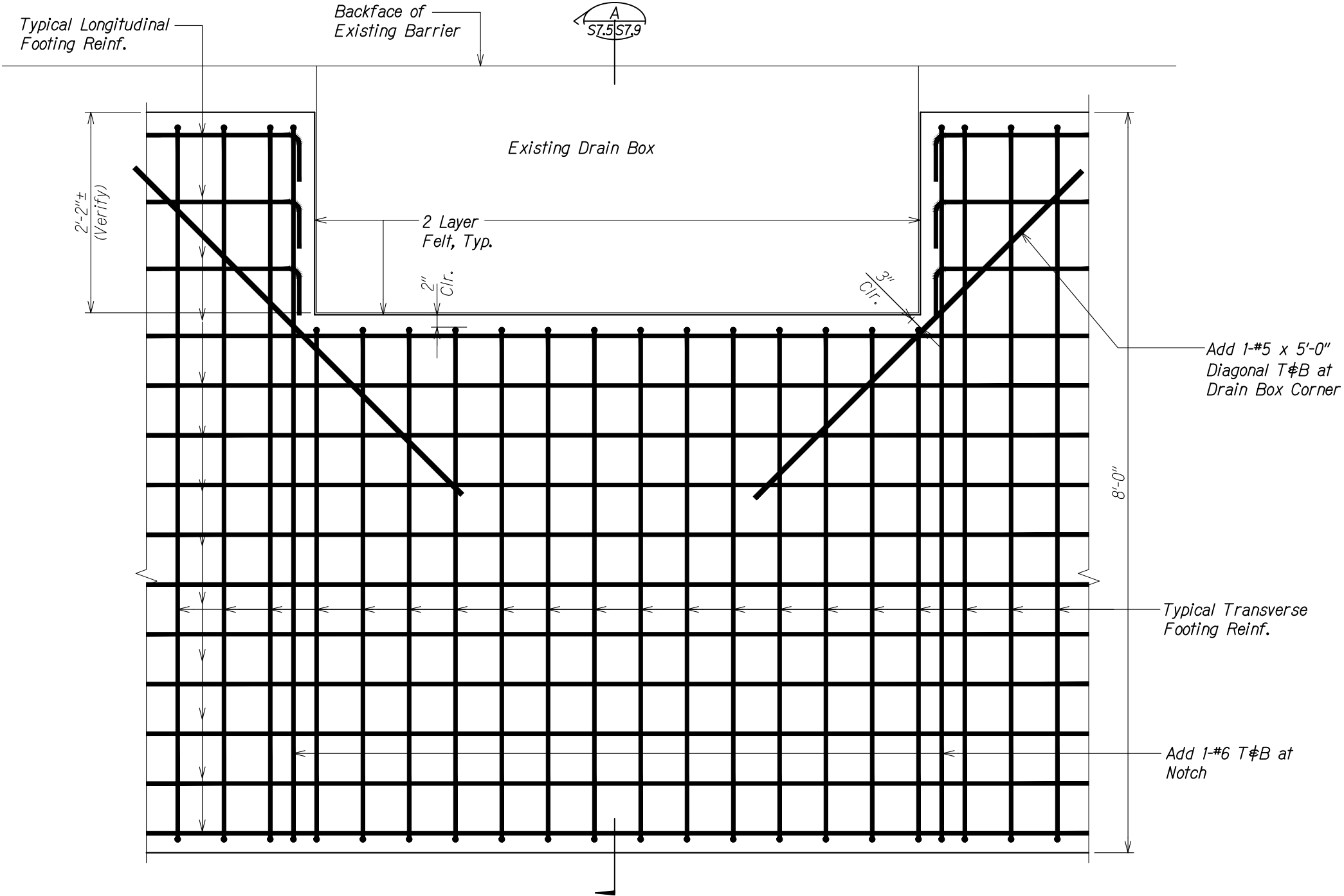
**ANCHOR BEAM PLAN AND**  
**SECTION**

*PALI HIGHWAY*  
*LANDSLIDE MITIGATION PROJECT*  
*FAP Proj. No. ER-22(002)*

Scale: As Noted Date: May 6, 2019

SHEET NO. *57.4* OF *11* SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	57	94



PARTIAL PLAN - WALL  
AT EXISTING DRAIN BOX  
Scale: 1 1/2" = 1'-0"



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

DRAWING NAME: Z:\00 ONGOING\19-014.1 PALI ROOF SHED-WSP TIA 01 CAD\05-06-19 TOPO\PLM-S0703-S0705-S0709 RETAINING WALL.DWG PLOT TIME: 05-06-19, 11:51 PM

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

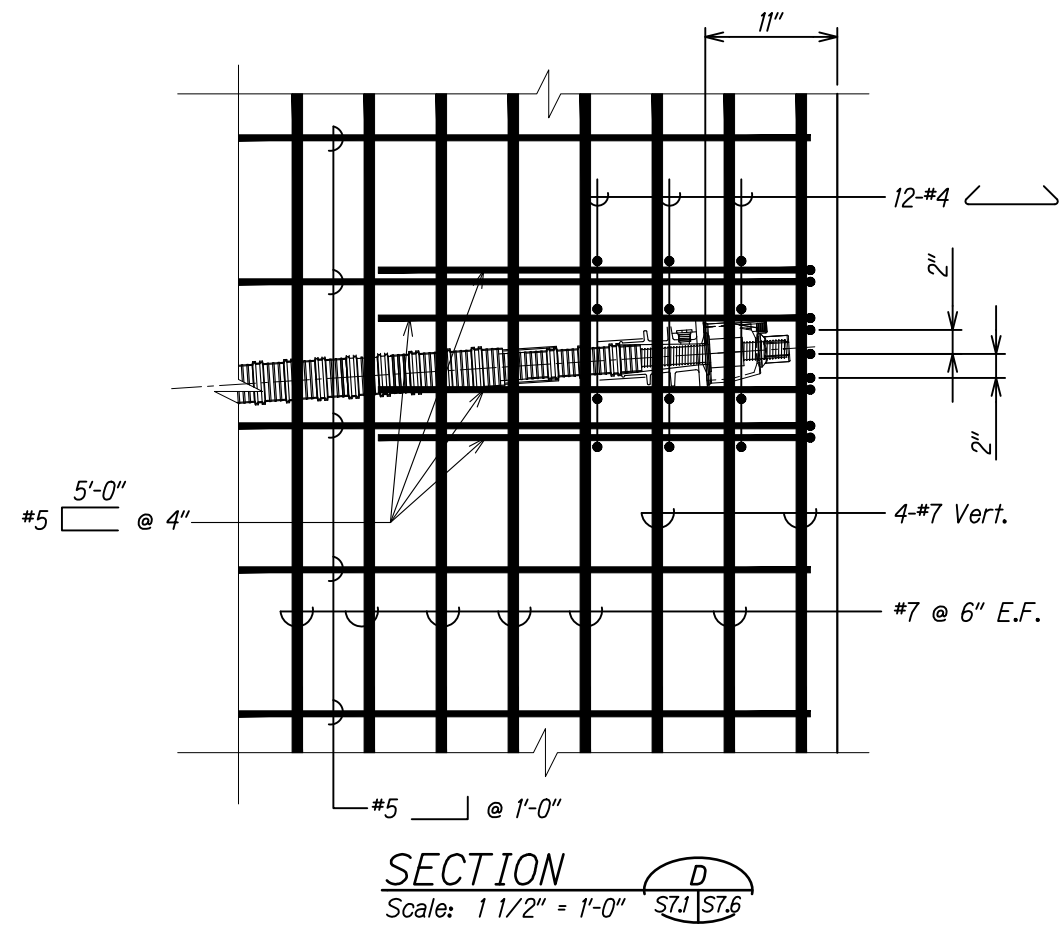
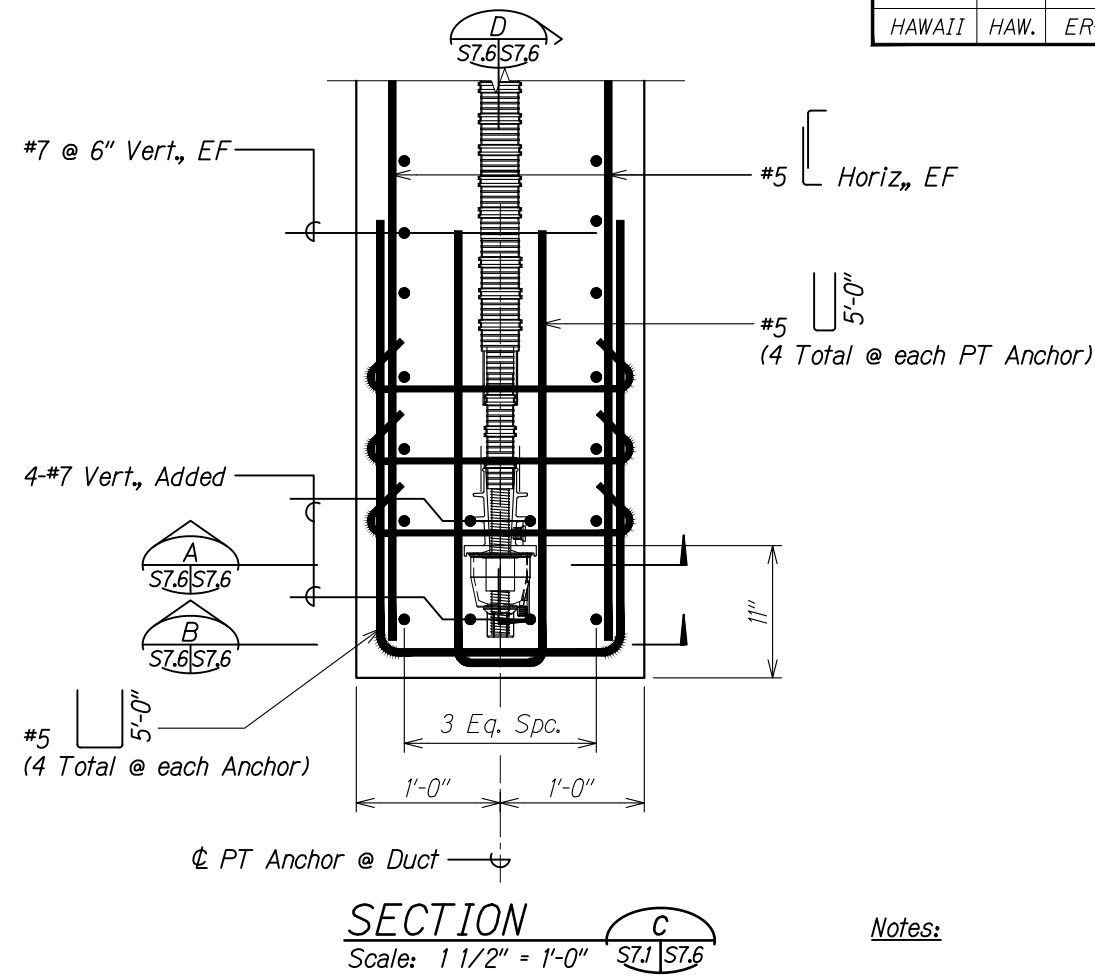
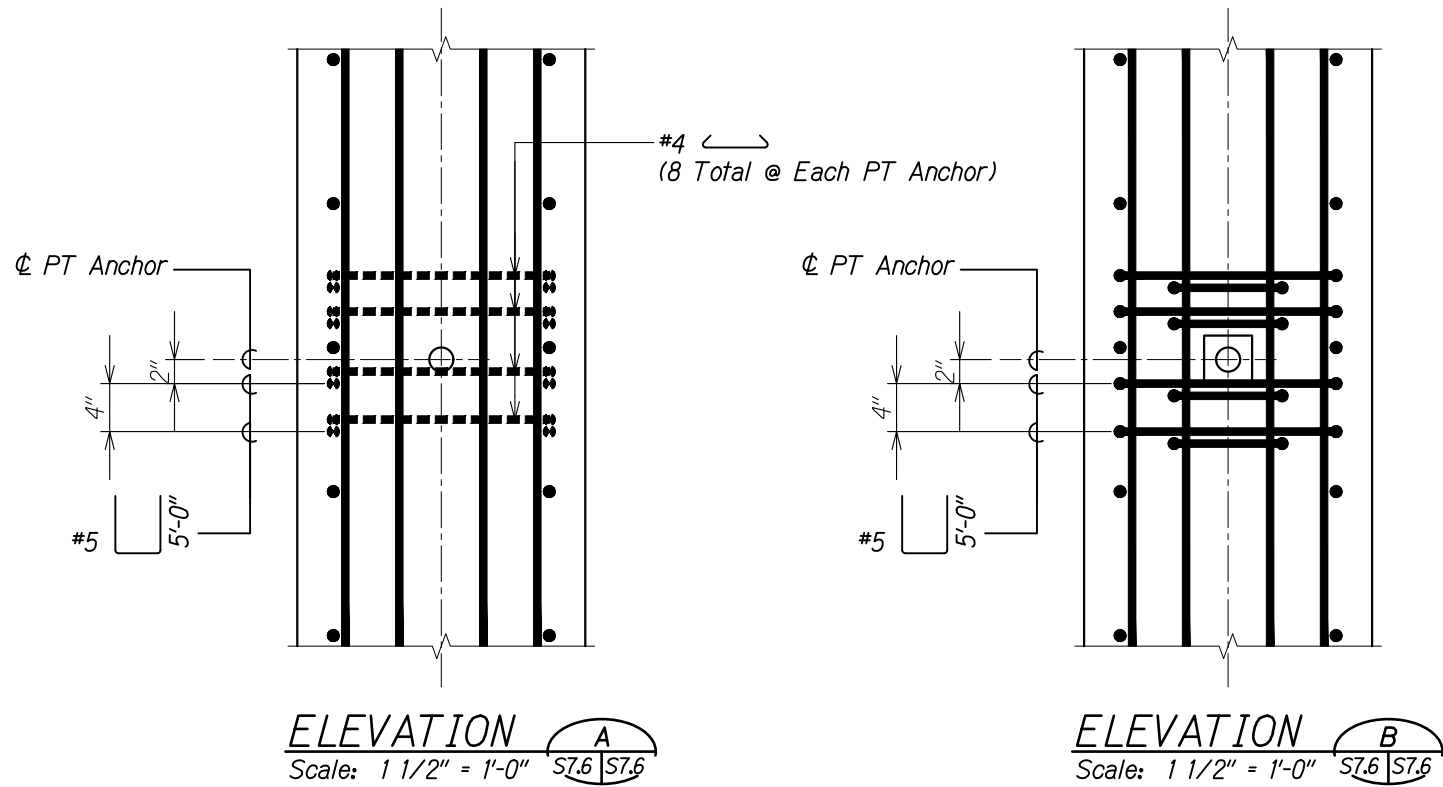
**PLAN AT EXISTING DRAIN BOX**

PALI HIGHWAY  
LANDSLIDE MITIGATION PROJECT  
FAP Proj. No. ER-22(002)

Scale: As Noted Date: May 6, 2019

SHEET No. S7.5 OF 11 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	58	94



- Notes:**
1. See Sheet S7.8 for Post-Tensioning Notes.
  2. Post-Tensioning are shown for illustrative purposes only.
  3. Contractor shall submit shop drawings.

ORIGINAL PLAN	DATE
NOTE BOOK	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

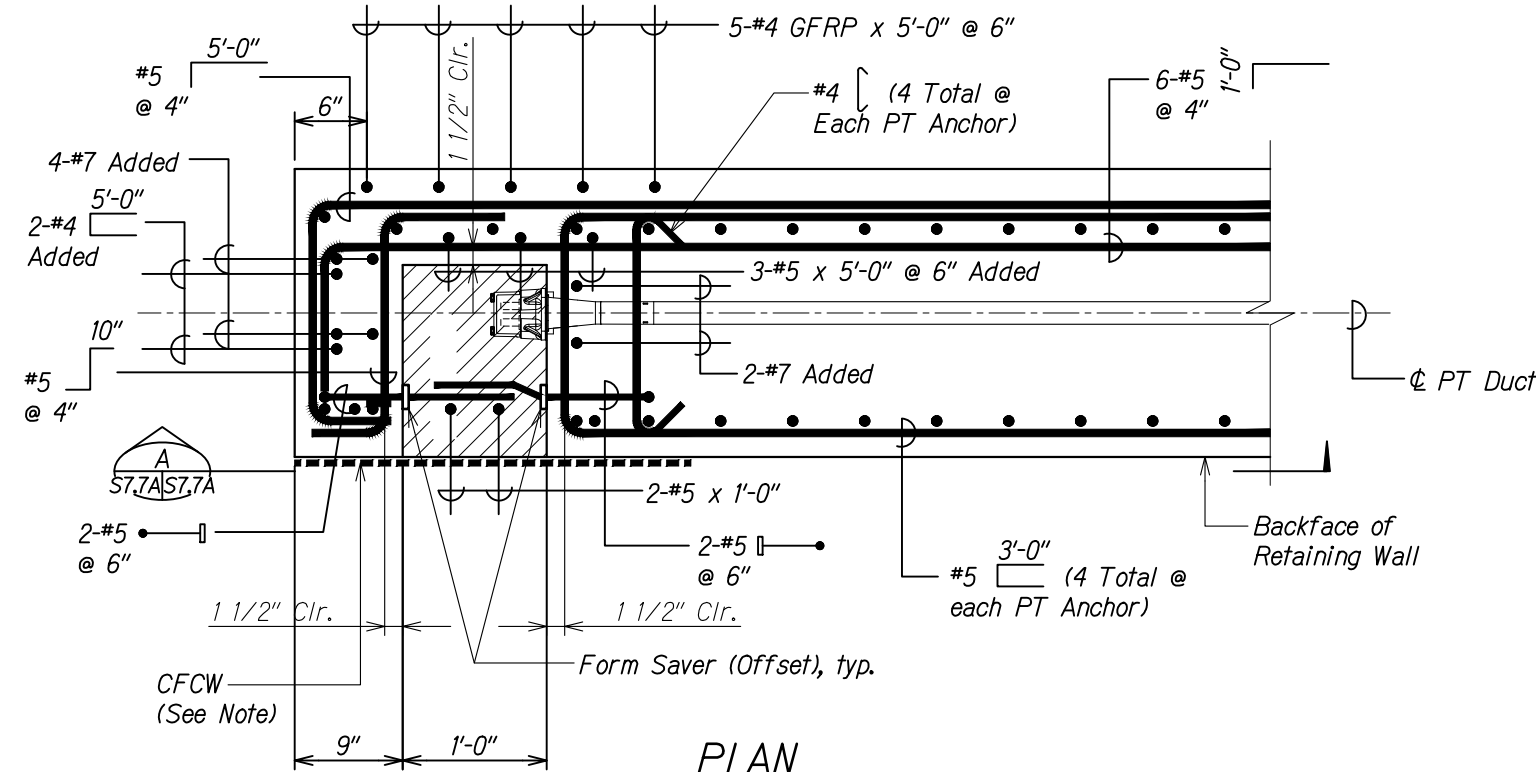
**POST-TENSIONING  
DEAD END ANCHOR**

PALI HIGHWAY  
LANDSLIDE MITIGATION PROJECT  
FAP Proj. No. ER-22(002)

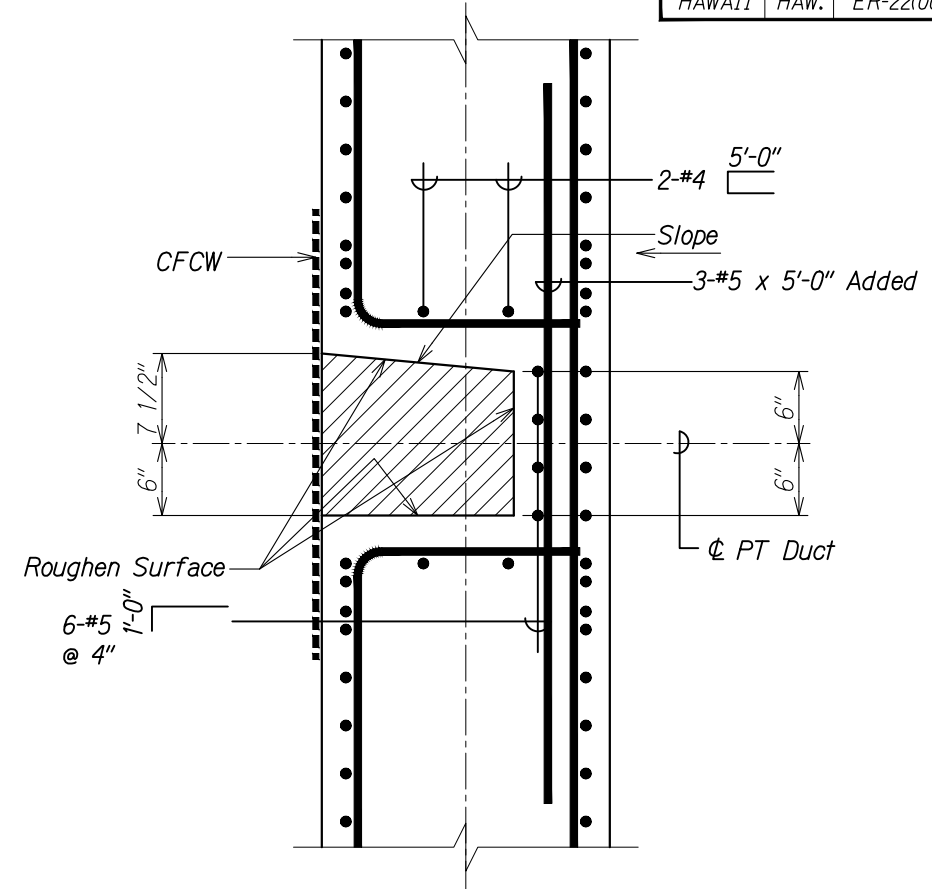
Scale: As Noted Date: May 6, 2019

SHEET No. S7.6 OF 11 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	59	94

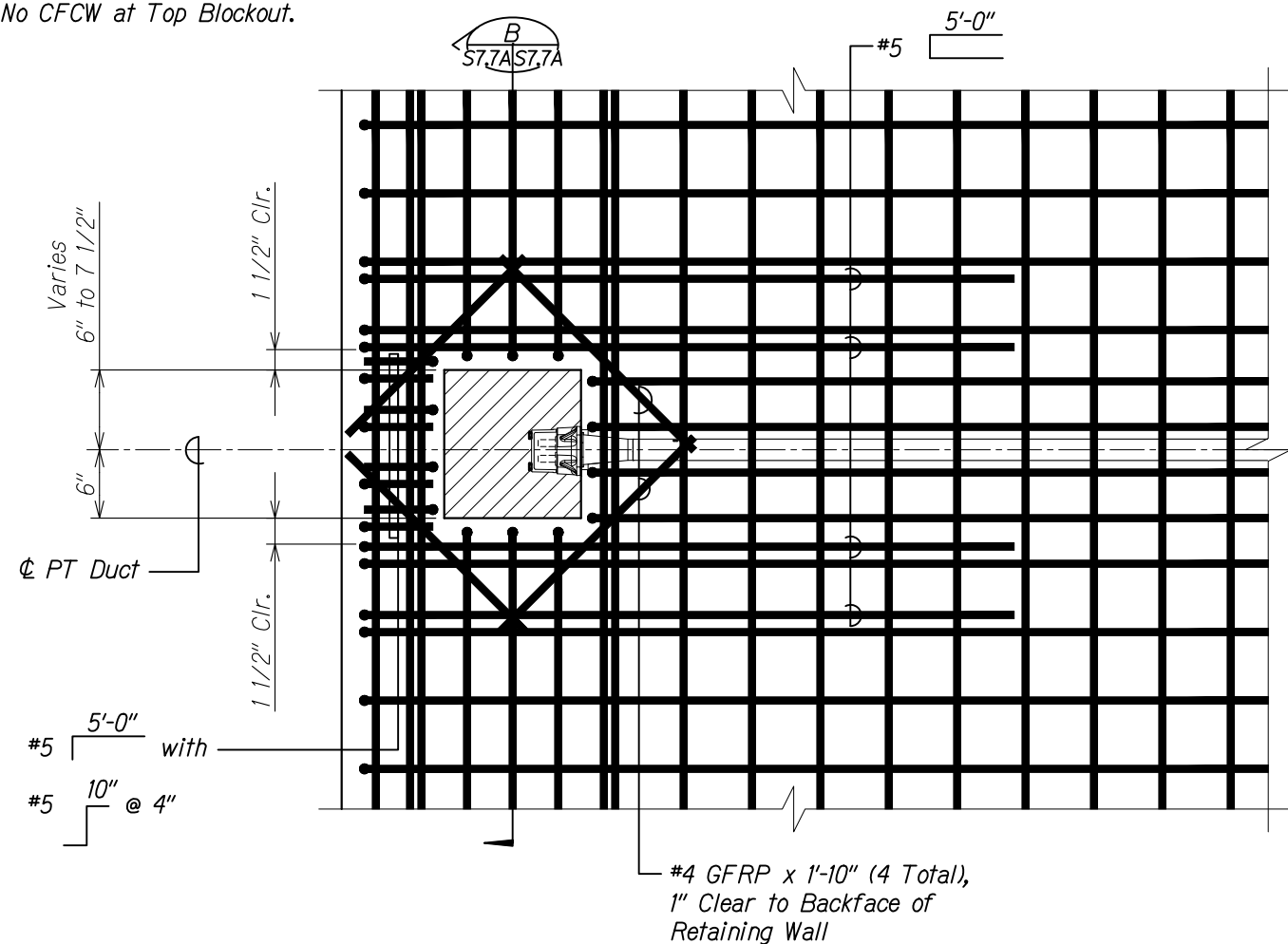


PLAN  
Scale: 1 1/2" = 1'-0"



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

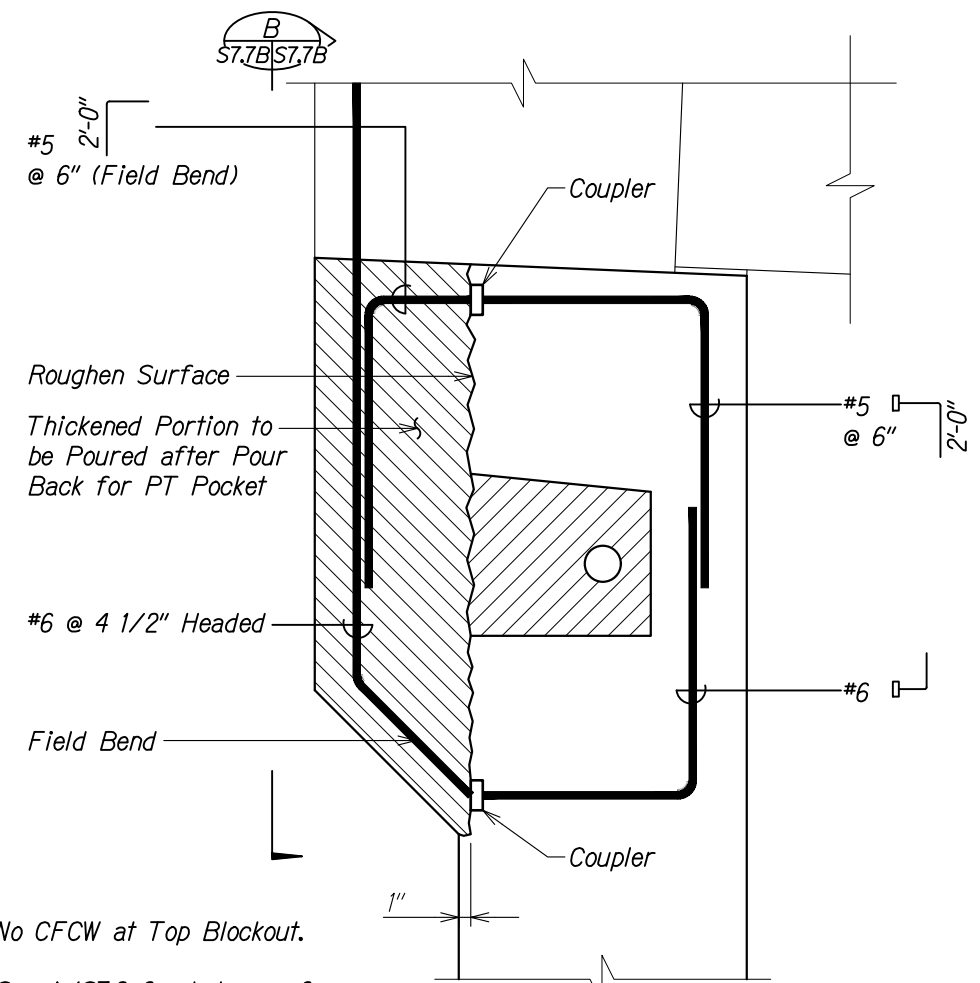
Legend:  
Indicated pour back with Duraltop Gel or equivalent (Follow all manufacturer's recommendations)



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

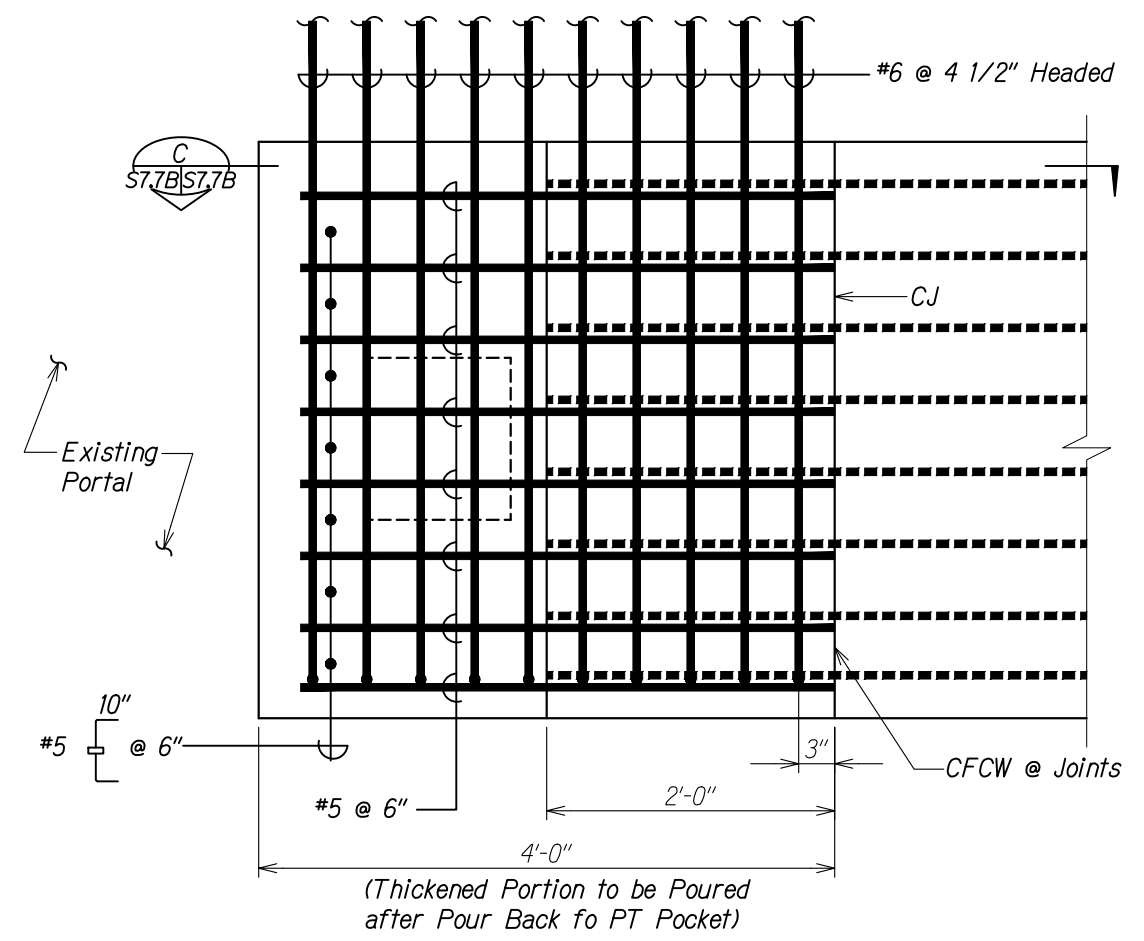
7/12/19	4 Replaced Sheet
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>POST-TENSIONING STRESSING END ANCHOR</b> PALI HIGHWAY LANDSLIDE MITIGATION PROJECT FAP Proj. No. ER-22(002) Scale: As Noted Date: May 6, 2019 SHEET No. S7.7A OF 11 SHEETS	

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	59	94

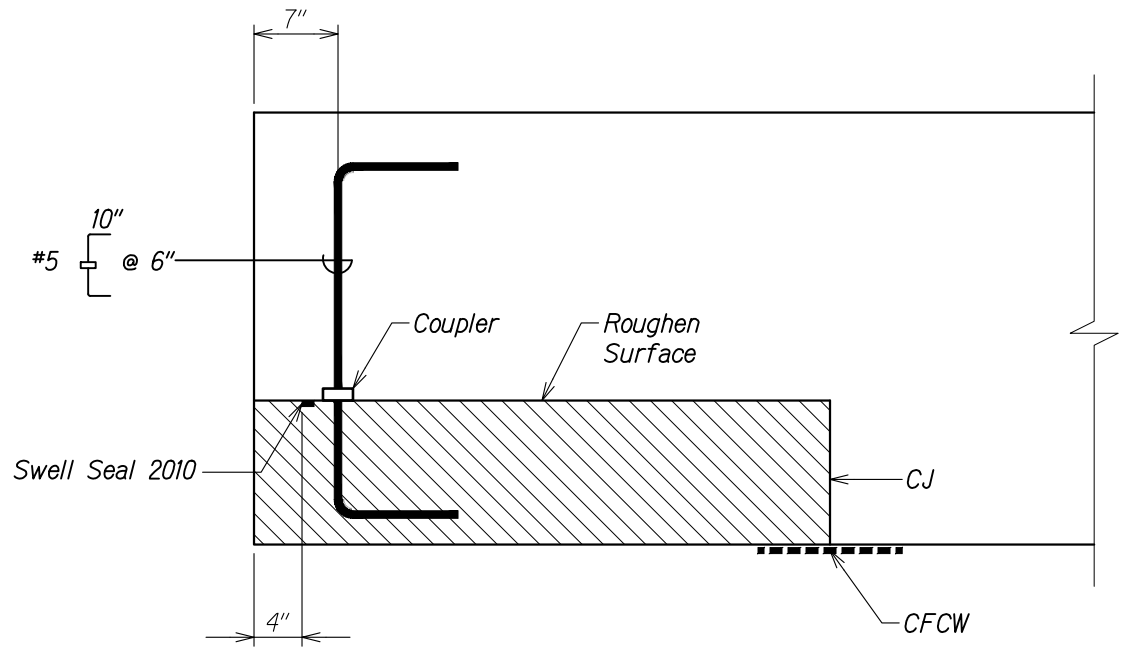


- Notes:
- No CFCW at Top Blockout.
  - See A/S7.2 for balance of reinforcing.

SECTION A  
Scale: 1 1/2" = 1'-0" S7.7B S7.7B



SECTION B  
Scale: 1 1/2" = 1'-0" S7.7B S7.7B



SECTION C  
Scale: 1 1/2" = 1'-0" S7.7B S7.7B

Legend:

- Indicated pour back with Duraltop Gel or equivalent (Follow all manufacturer's recommendations)
- Thickened Portion to be Poured after Pour Back for PT Pocket

Note:

- See A/S7.2 for balance of reinforcing.

ORIGINAL PLAN	DATE
NOTE BOOK	DESIGNED BY
	QUANTITIES BY
	CHECKED BY

7/12/19	4 Replaced Sheet
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**POST-TENSIONING  
STRESSING END ANCHOR**

PALI HIGHWAY  
LANDSLIDE MITIGATION PROJECT  
FAP Proj. No. ER-22(002)

Scale: As Noted Date: May 6, 2019

SHEET No. S7.7B OF 11 SHEETS



FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	60	94

POST-TENSIONING NOTES

1. *Post-tensioning threaded bars shall be 1 3/8" Diameter ASTM A722 Grade 150. Post-tensioning ducts shall be Spiro-Type Semi-Rigid Galvanized.*
2. *After Post-tensioning, ducts shall be pressure grouted with Masterflow 1205 cable grout, Sika Grout 300 PT, or approved equal. Ducts shall have grouting vents at anchorage.*
3. *Ducts shall be secured to prevent misalignment or leakage during concrete pour.*
4. *Post-tension threaded bars 4 days after completion of wall concrete pour. (Stress top bar first and bottom bar last).*
5. *Prevent ducts, at all times, from getting plugged or damaged.*
6. *The post-tensioning design assumptions are as follows:*

*Curve Friction Coefficient      0.30*  
*Wobble Friction Coefficient    0.0002/ft.*  
*Anchor Set                        1/16"*
7. *Required force per threaded bar after initial stressing losses shall be 166<sup>k</sup>.*
8. *Post-tensioning shall comply with AASHTO LRFD Bridge Construction Specifications including the latest interim revisions.*
9. *Prior to grouting and within two days after complete installation of bars, a corrosion inhibitor amine carboxylate powder (Cortec MCI-309) shall be blow into the ducts.*
10. *The minimum force in Prestressing Steel shall not be less than shown in Note 7 above.*

*The force in the Prestressing Steel shall be considered as the smaller of the two values as determined by the measured elongation and the gage pressure. If the difference in stress as obtained by the measured elongation and the measured gage pressure exceeds 5 percent of the required prestressing force, the stressing process shall be terminated and shall not resume until the Contractor submits data indicating the cause of such difference and makes corrections, approved by the Engineer, to rectify such difference.*

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

DRAWING NAME: Z:\00 ONGOING\19-014.1 PALI ROOF SHED-WSP-TM\01 CAD\05-06-19 TOPO\PLM-50706-50708 PT IN RW.DWG PLOT TIME: 05-06-19, 11:54 PM

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

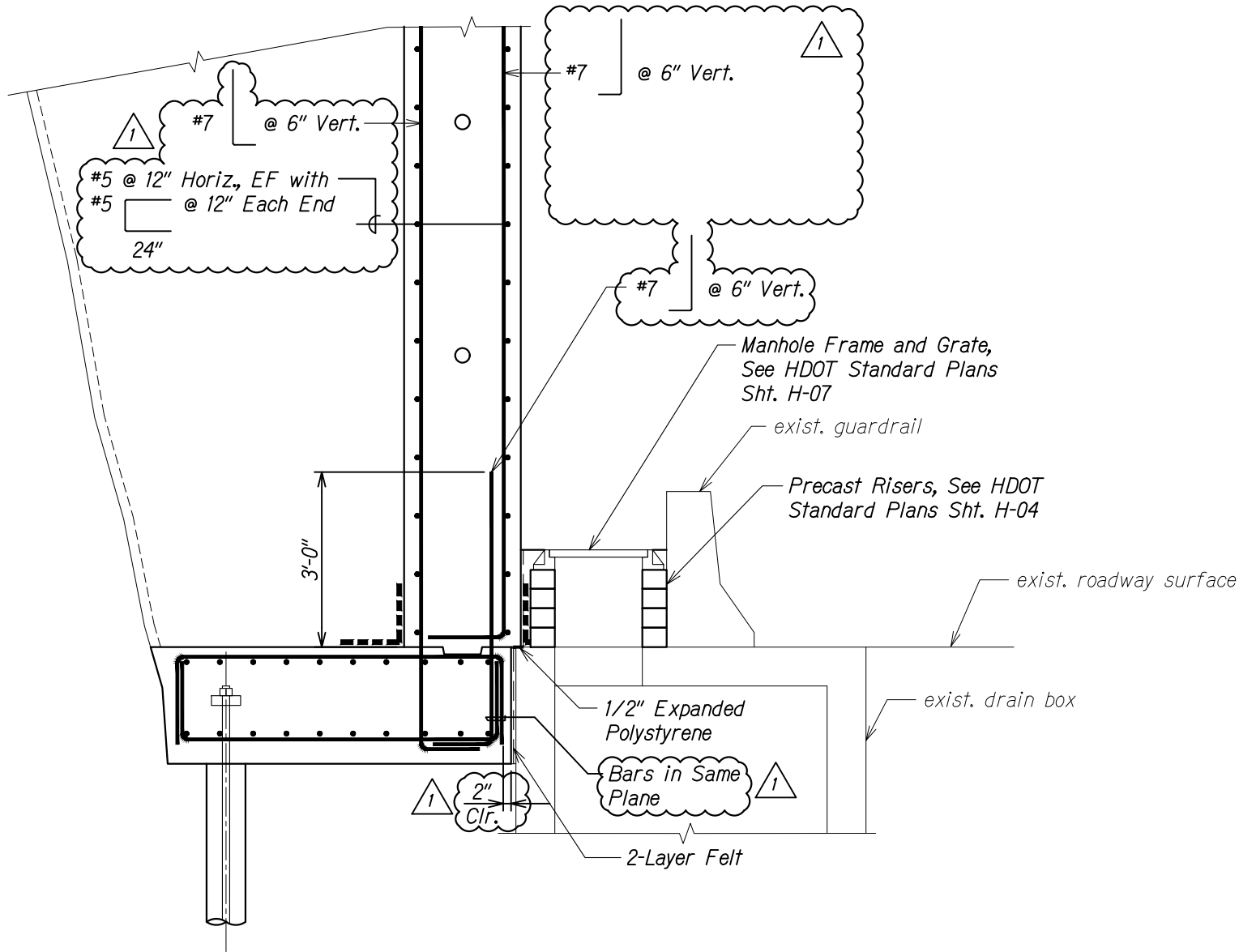
POST-TENSIONING NOTES

PALI HIGHWAY  
LANDSLIDE MITIGATION PROJECT  
FAP Proj. No. ER-22(002)

Scale: As Noted      Date: May 6, 2019

SHEET No. 57.8 OF 11 SHEETS

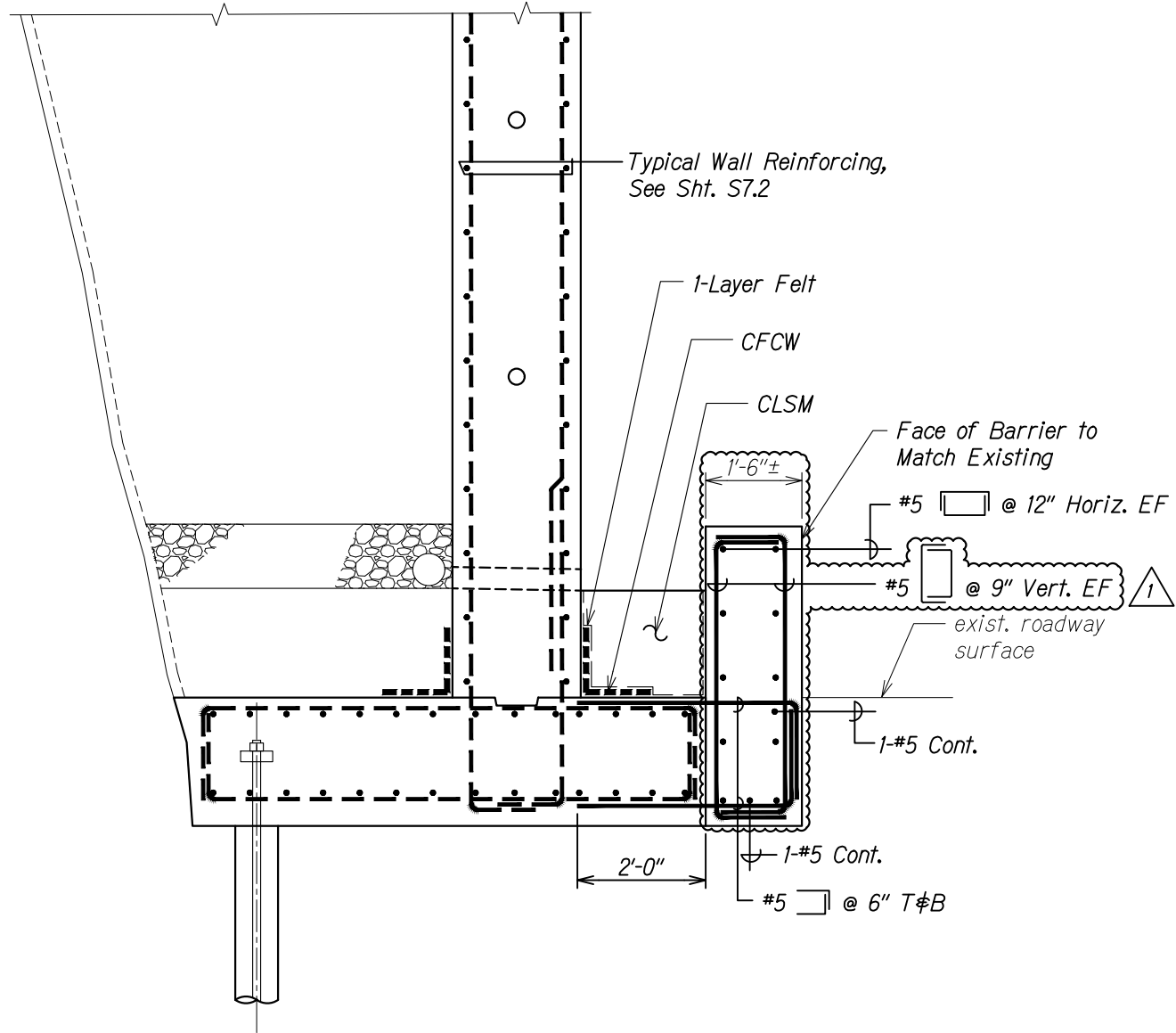
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	ADD 61	94



RETAINING WALL SECTION  
AT DRAIN BOX

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


A  
S7.5 S7.9



RETAINING WALL SECTION  
AT NEW BARRIER

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

B  
S7.4 S7.9

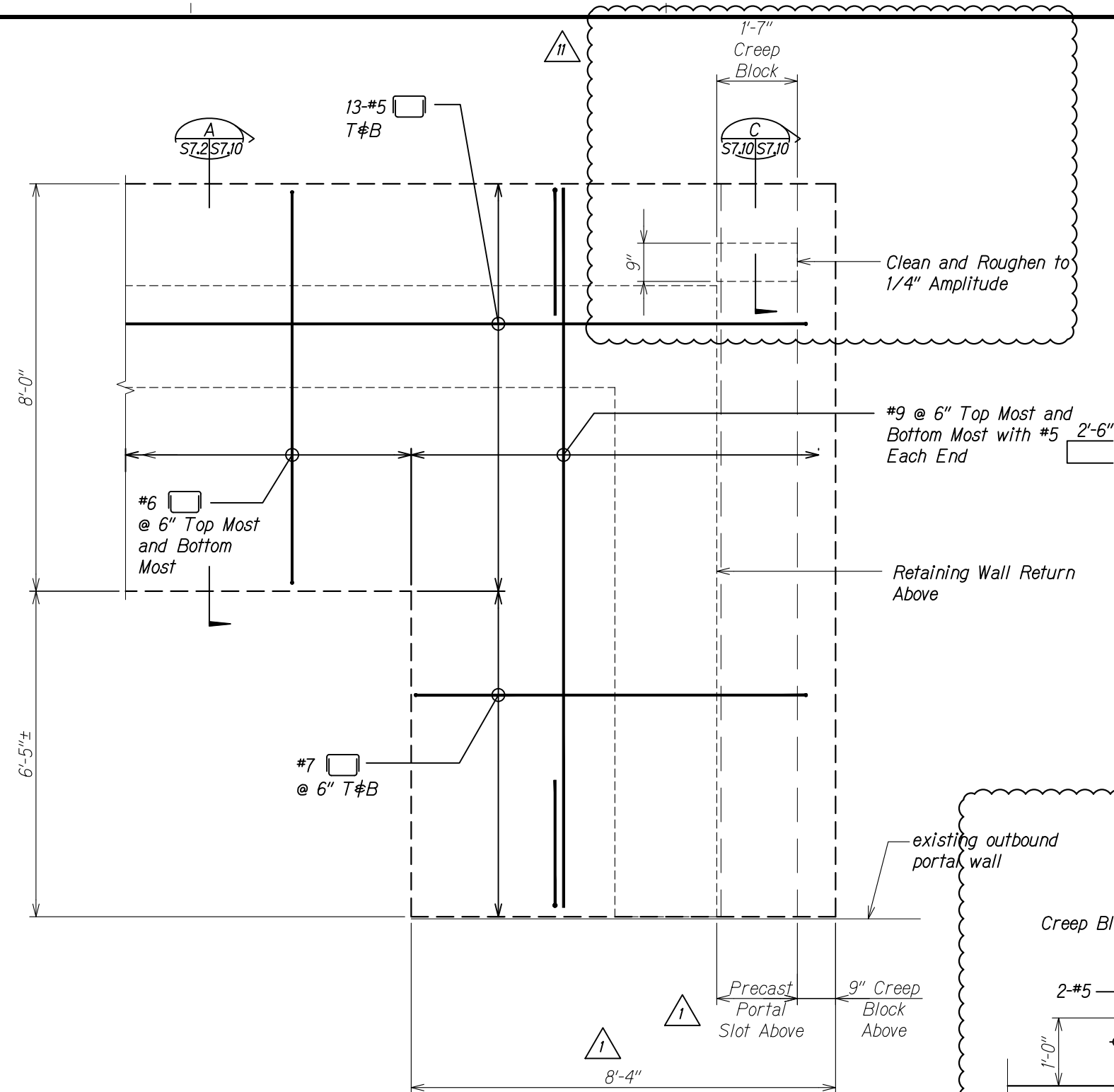
5/24/19		<i>Revised Section and Notes, Added Notes</i>
DATE	REVISION	

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<u><b>RETAINING WALL SECTIONS</b></u>	
<u><b>PALI HIGHWAY</b></u>	
<u><b>LANDSLIDE MITIGATION PROJECT</b></u>	
<u><b>FAP Proj. No. ER-22(002)</b></u>	
<i>Scale: As Noted</i>	<i>Date: May 6, 2019</i>
SHEET No. <b>S7.9</b> OF <b>11</b> SHEETS	

ORIGINAL PLAN	DATE
NOTE BOOK	
NO.	


DRAWING NAME: Z:\00 ONGOING\19-014.1 PALI ROOF SHED-WSP TIA 01 CAD\05-24-19 PH 2\PLM-S0703-S0705-S0709-S0710-ADD1 RETAINING WALL.DWG PLOT TIME: 06-03-19, 11:26 AM

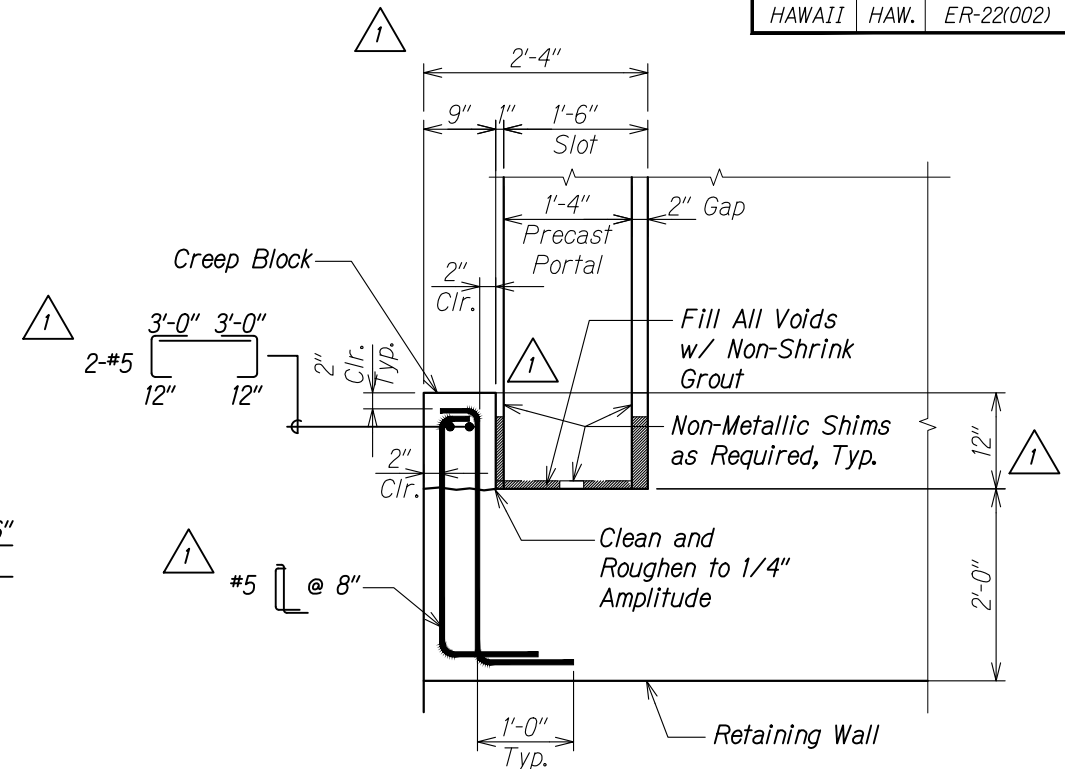
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	ADD 62	94



PARTIAL FOOTING PLAN AT  
RETAINING WALL RETURN

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

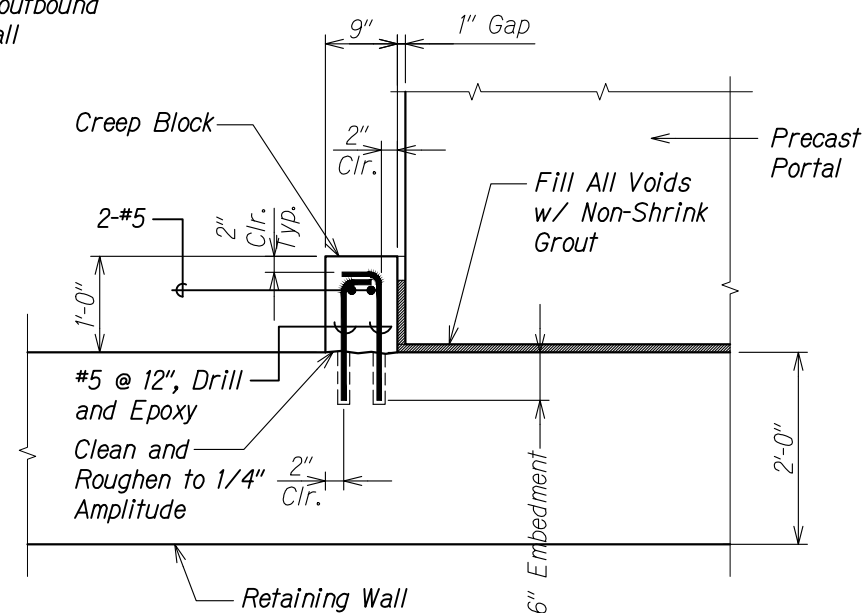




RETAINING WALL  
CREEP BLOCK REINF.

Scale: 1" = 1'-0"







RETAINING WALL  
CREEP BLOCK REINF.

Scale: 1" = 1'-0"



S7.10 S7.10

11/15/19	 Added Creep Block
5/24/19	 Revised Section and Notes, Added Notes
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**RETAINING WALL RETURN**  
**FOOTING PLAN**

**PALI HIGHWAY**  
**LANDSLIDE MITIGATION PROJECT**  
**FAP Proj. No. ER-22(002)**

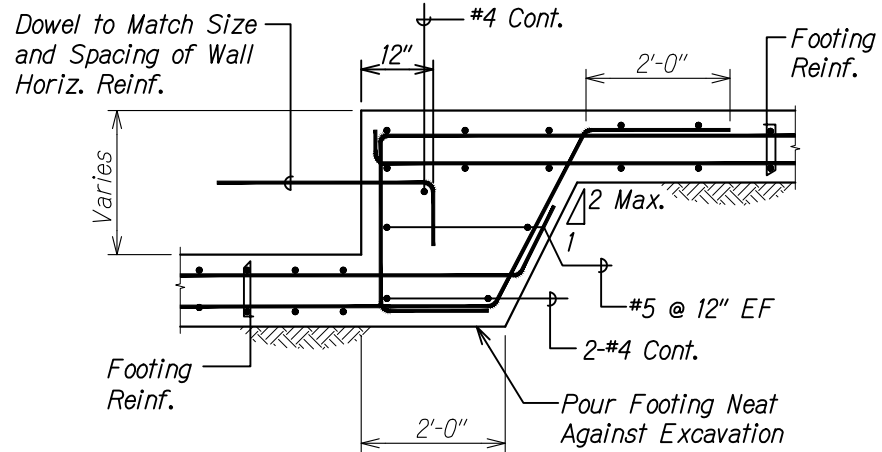
Scale: As Noted      Date: May 6, 2019

SHEET No. *57.10* OF 11 SHEETS

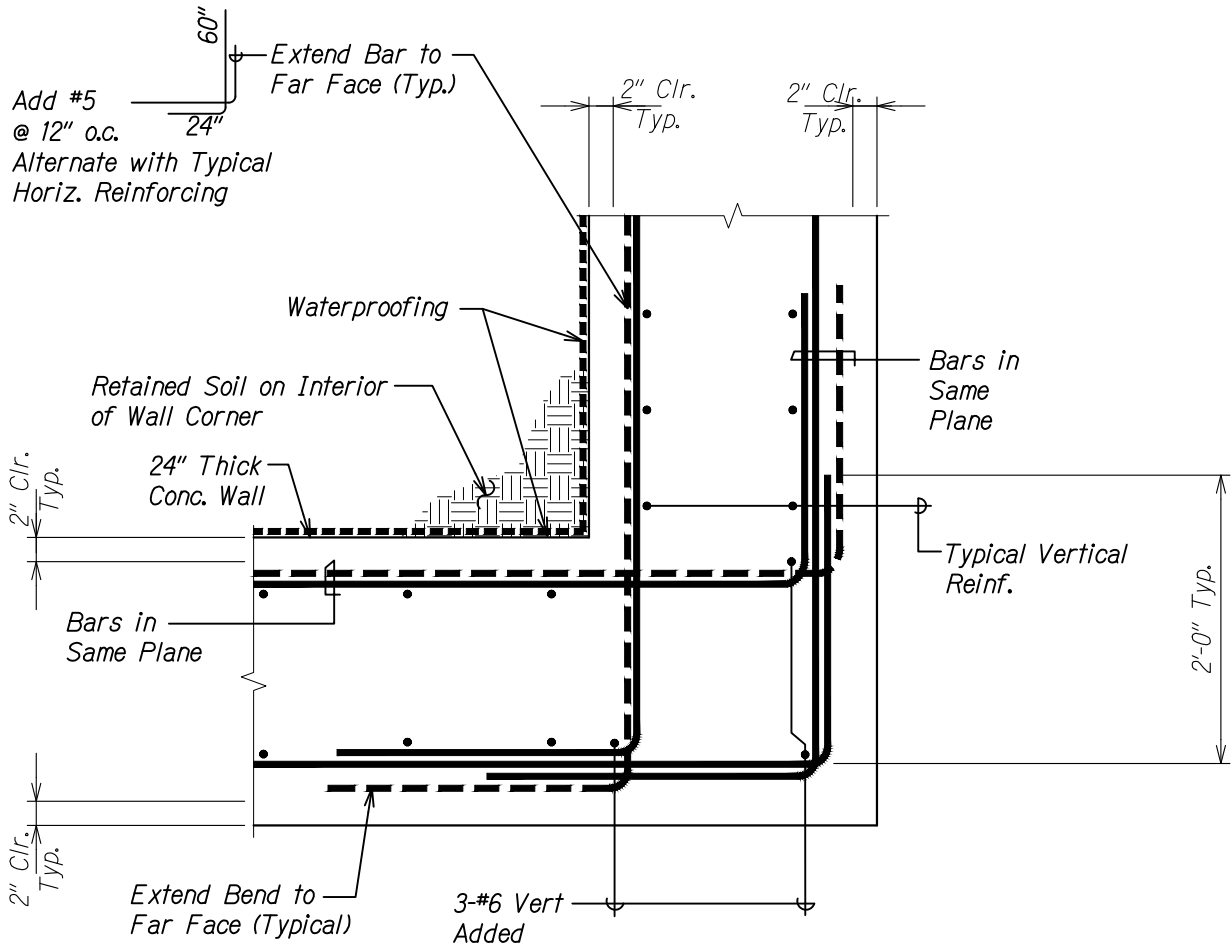
DRAWING NAME: Z:\00 ONGOING\19-014.1A PALI ROOF SHED POST DESIGN-WSP TM\01 CAD\04-06-20B RF123 RYSD REBAR\PLM-S0703-S0705 S0709 S0710 ADD1 DELTA11 RETAINING WALL.DWG PLOT TIME: 07-02-20, 11:12 AM)

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

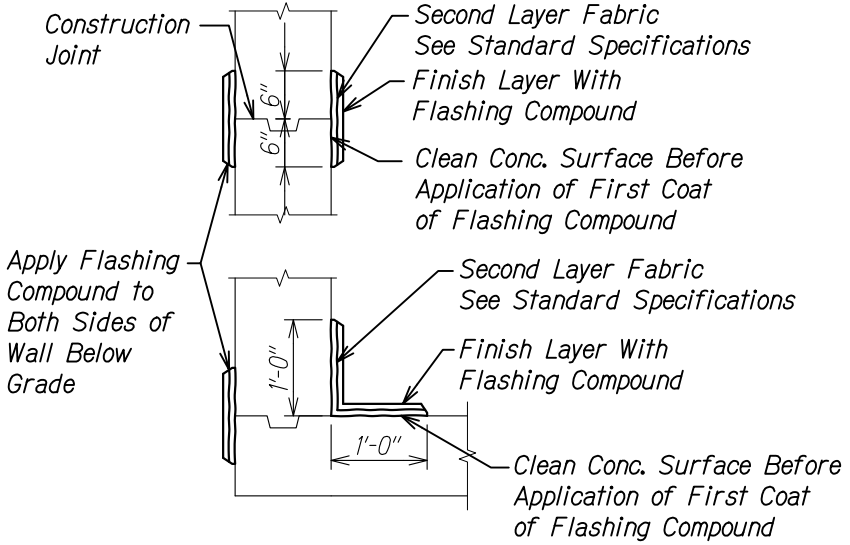
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	63	94



**TYPICAL FOOTING STEP DETAIL**  
Scale: 3/4" = 1'-0"  
1  
S7.11 S7.11



**WALL REINFORCING AT CORNER**  
Scale: 1 1/2" = 1'-0"  
A  
S7.11 S7.11



**TYP. CONTINUOUS FLASHING COMPOUND WATERPROOFING (CFCW) DETAILS**  
Not to Scale  
2  
S7.11 S7.11

ORIGINAL PLAN	DATE
NO.	

DRAWING NAME: Z:\00 ONGOING\19-014.1 PALI ROOF SHED-WSP TIA 01 CAD\05-08-19 TOPO\PLM-S0711 CFCW.DWG PLOT TIME: 05-08-19, 11:54 PM

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

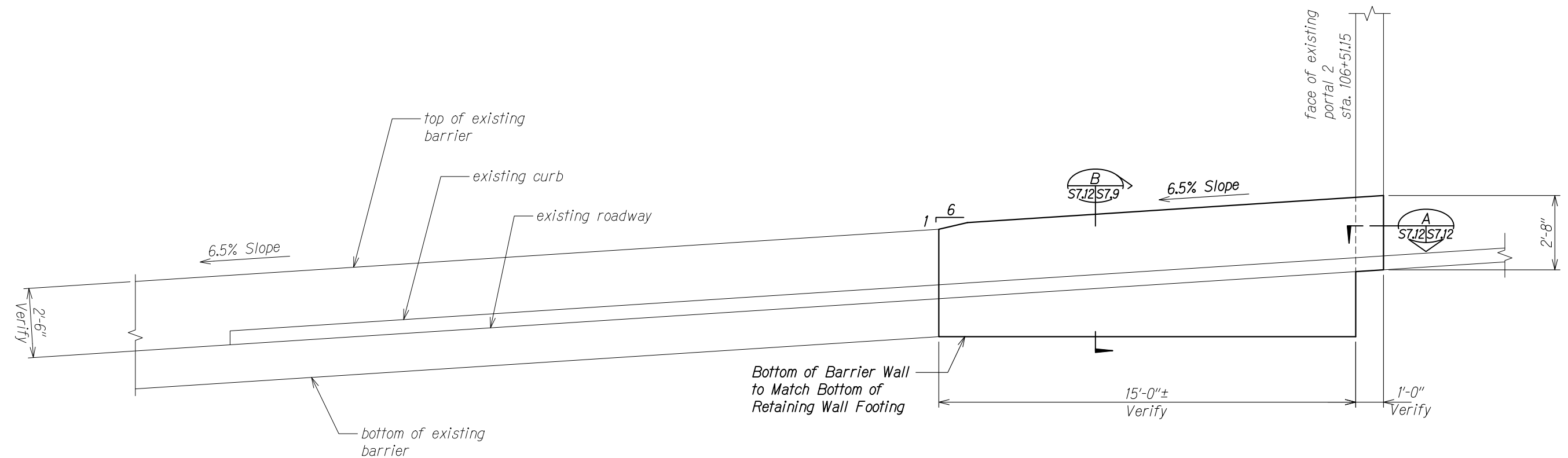
**TYPICAL WALL DETAILS**

PALI HIGHWAY  
LANDSLIDE MITIGATION PROJECT  
FAP Proj. No. ER-22(002)

Scale: As Noted Date: May 6, 2019

SHEET No. S7.11 OF 11 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	ADD 635-1	94

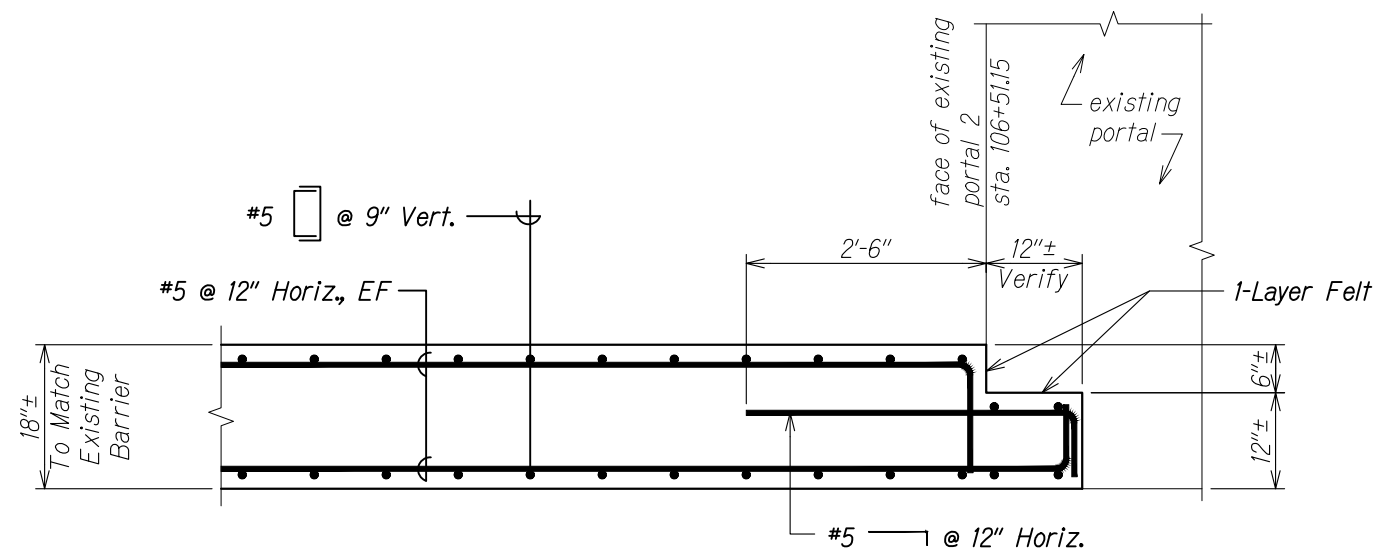


BARRIER ELEVATION


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

A

S7.12 | S7.12



PARTIAL PLAN AT NEW CONCRETE BARRIER A  
Scale: 1" = 1'-0" S7.12 S7.12

5/24/19	 <i>New Sheet</i>
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

***BARRIER ELEVATION***

*PALI HIGHWAY*  
***LANDSLIDE MITIGATION PROJECT***  
***FAP Proj. No. ER-22(002)***

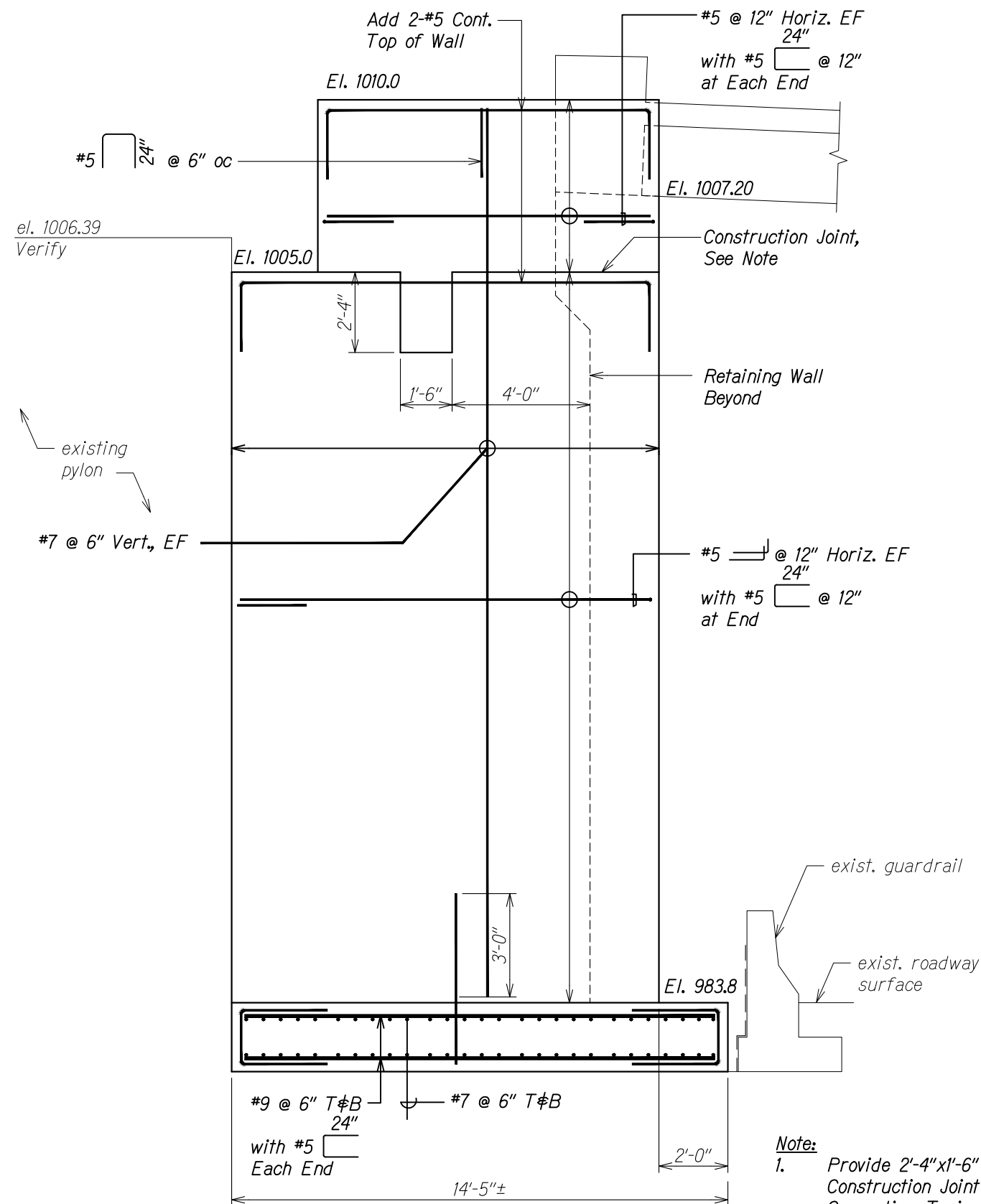
*Scale: As Noted*                      *Date: May 6, 2019*

SHEET No. *S7.12* OF *11* SHEETS

**ADD 63S-1**

DRAWING NAME: Z:\00 ONGOING\19-014.1 PALI ROOF SHED-WSP.TM\01 CAD\05-24-19 PH 2\PLM-S0712 ADD1 BARRIER.DWG PLOT TIME: 06-03-19, 11:28 AM

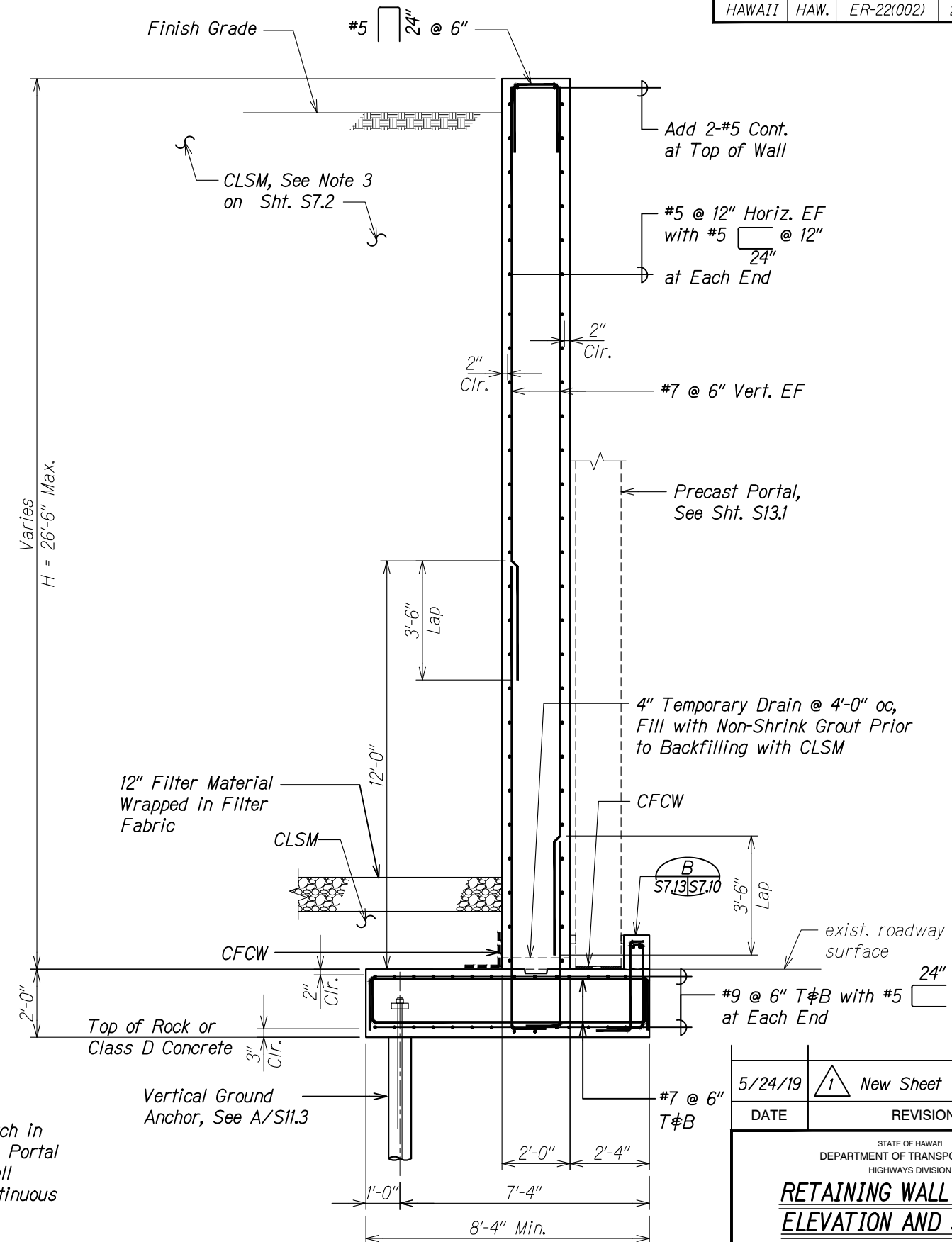
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	ADD 63S-2	94



**Note:**


1. Provide 2'-4"x1'-6" Notch in Construction Joint for Portal Connection. Typical Wall Reinforcing to be Continuous through Notch.

RETAINING WALL RETURN ELEVATION   
Scale: 1/2" = 1'-0" S7.13 S7.13



RETAINING WALL RETURN ELEVATION 

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

5/24/19	 New Sheet
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**RETAINING WALL RETURN**  
**ELEVATION AND SECTION**

**PALI HIGHWAY**  
**LANDSLIDE MITIGATION PROJECT**  
**FAP Proj. No. ER-22(002)**

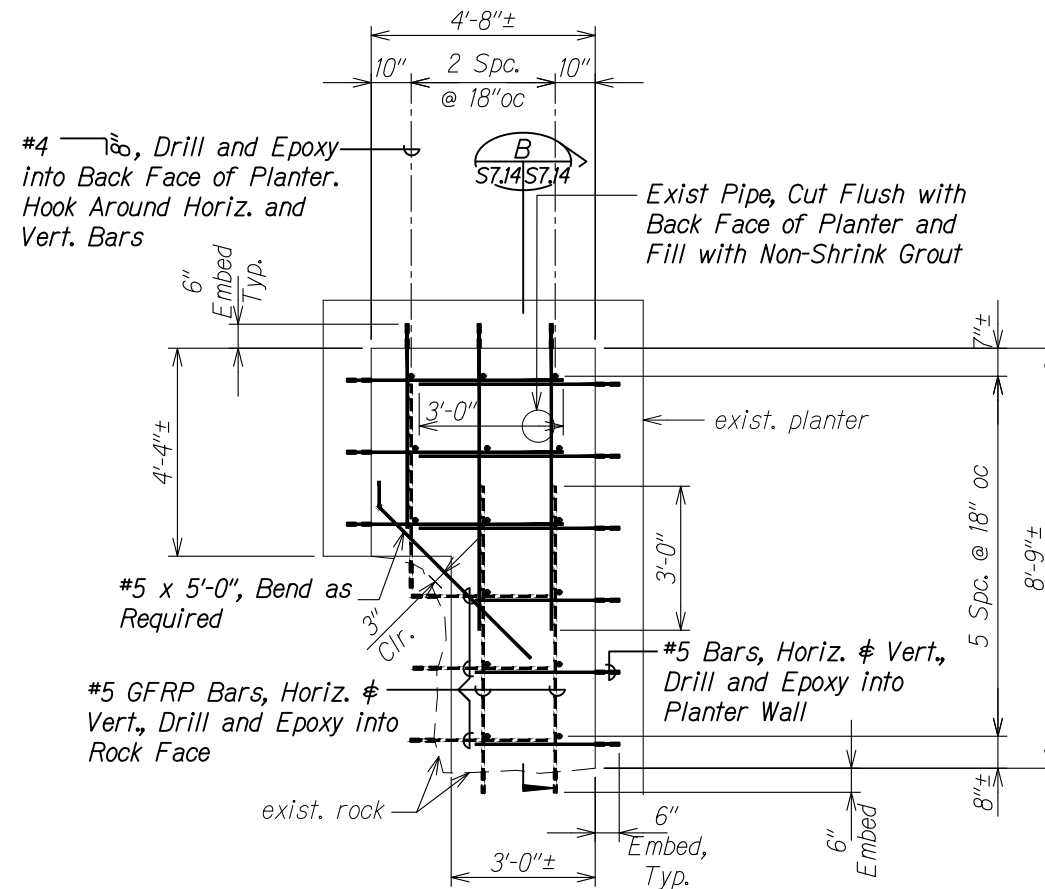
Scale: As Noted      Date: May 6, 2019

SHEET No. *S7.13* OF 11 SHEETS

**ADD 63S-2**

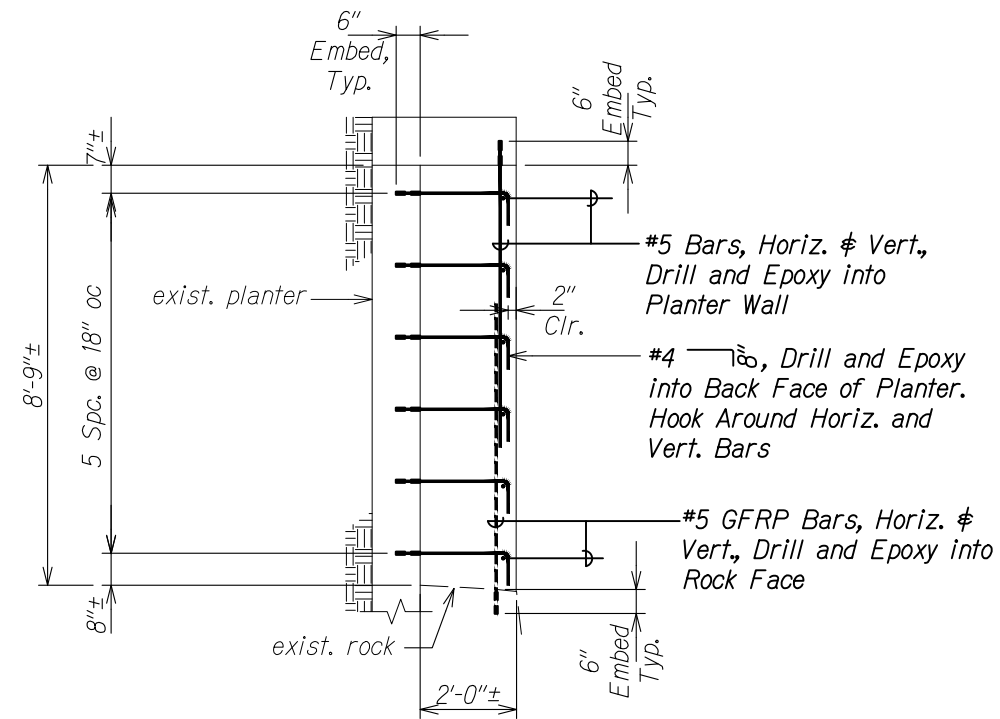
DRAWING NAME: 7:\00 ONGOING\ 19-014 1 PALL ROOF SHED-WSP TIA\01 CAD\ 05-24-19 PH 2\ PIM-S0712 ADD1 BARRIER DWG PLOT TIME: 06-03-19 11:28 AM)

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-22(002)	2019	ADD 635-3	94



ELEVATION - INFILL WALL

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




SECTION

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

Notes:

1. Concrete shall develop a minimum 28-day compressive strength of 4,000 psi. Concrete mix shall contain an Amine Carboxylate water-based corrosion inhibitor admixture, a shrinkage reducing admixture and alkali resistant structural glass fiber. See Structural General Notes on S0.2 for admixture information.
2. See S0.2 and S0.3 for additional requirements.

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

6/17/19	 Reference RF1007 - New Sheet
DATE	REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**INFILL WALL**

**PALI HIGHWAY**  
**LANDSLIDE MITIGATION PROJECT**  
**FAP Proj. No. ER-22(002)**

Scale: As Noted      Date: May 6, 2019

SHEET No. **S7.14** OF **11** SHEETS

DRAWING NAME: Z:\00 ONGOING\19-014.1A PALI ROOF SHED POST DESIGN-WSP TM\01 CAD\04-06-20B RF123 RYSD REBAR\PLM-S0712 ADD1 DELTA4 BARRIER.DWG PLOT TIME: 07-02-20, 11:22 AM)