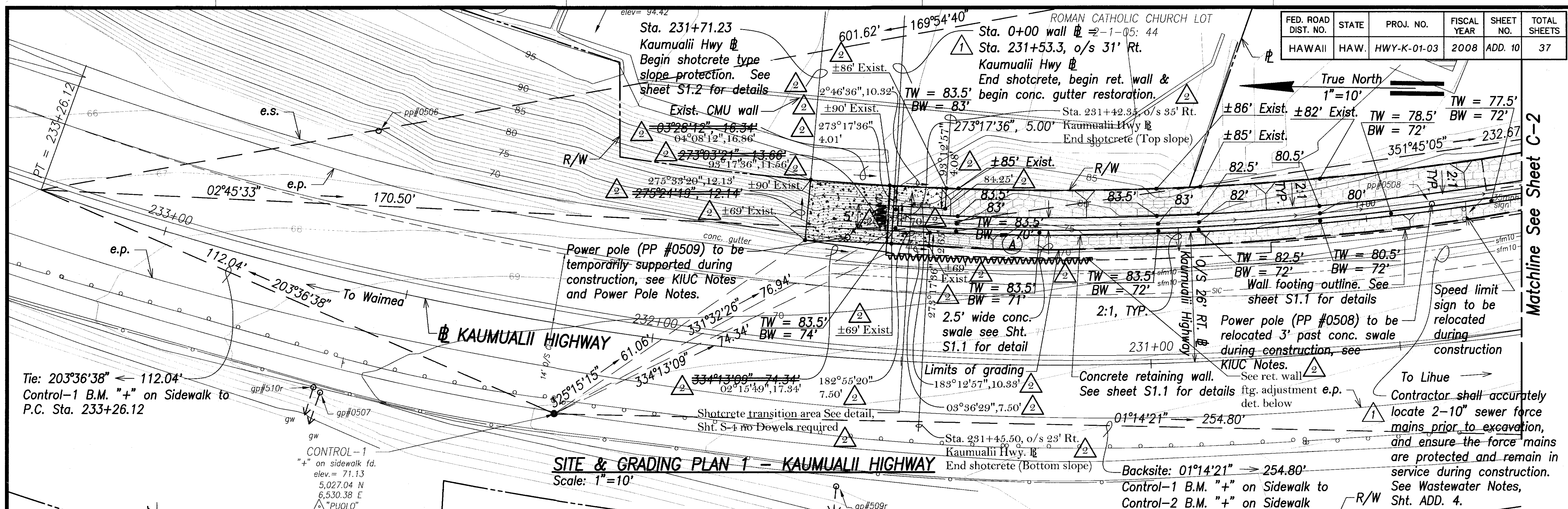
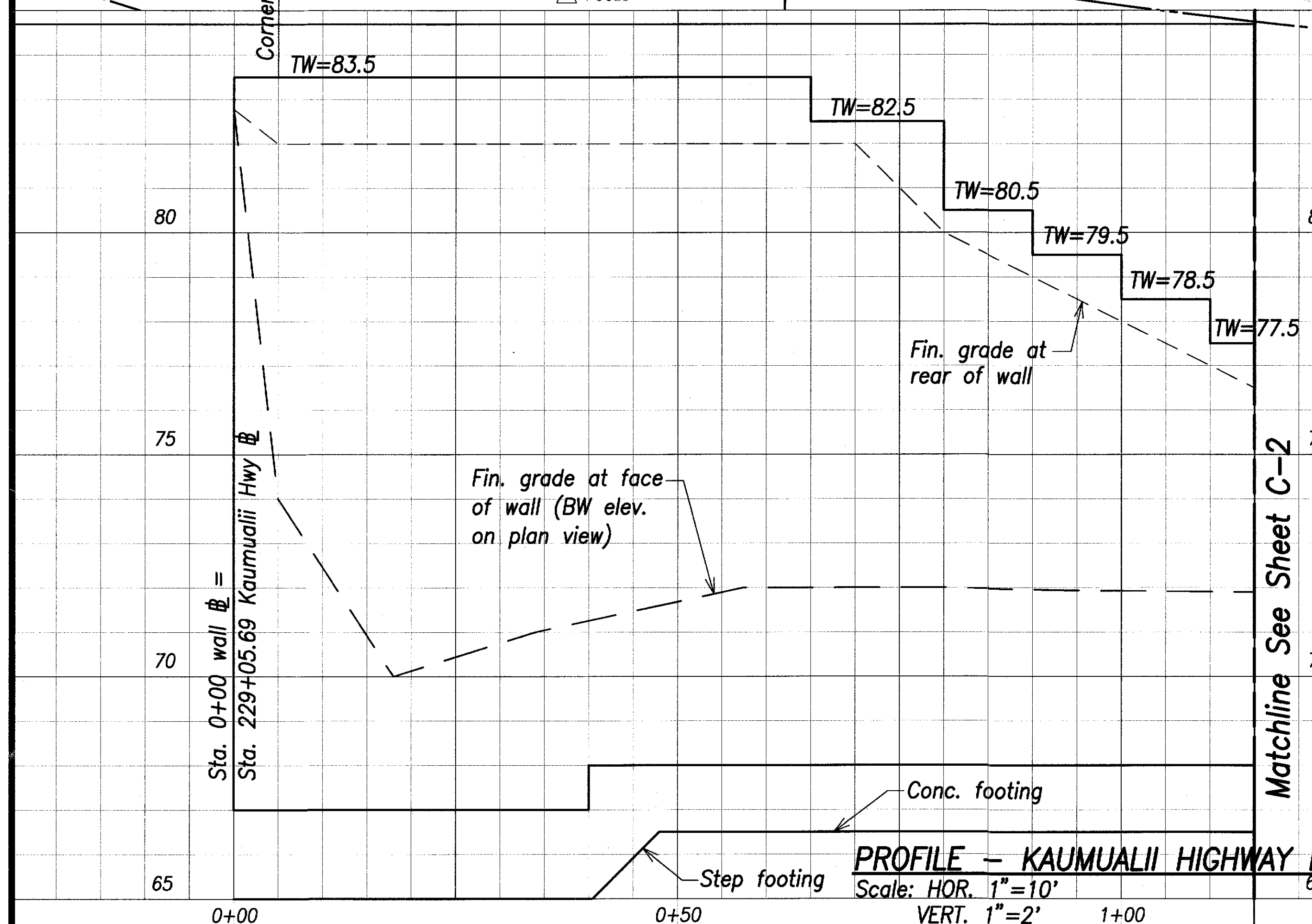


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	ADD. 10	37

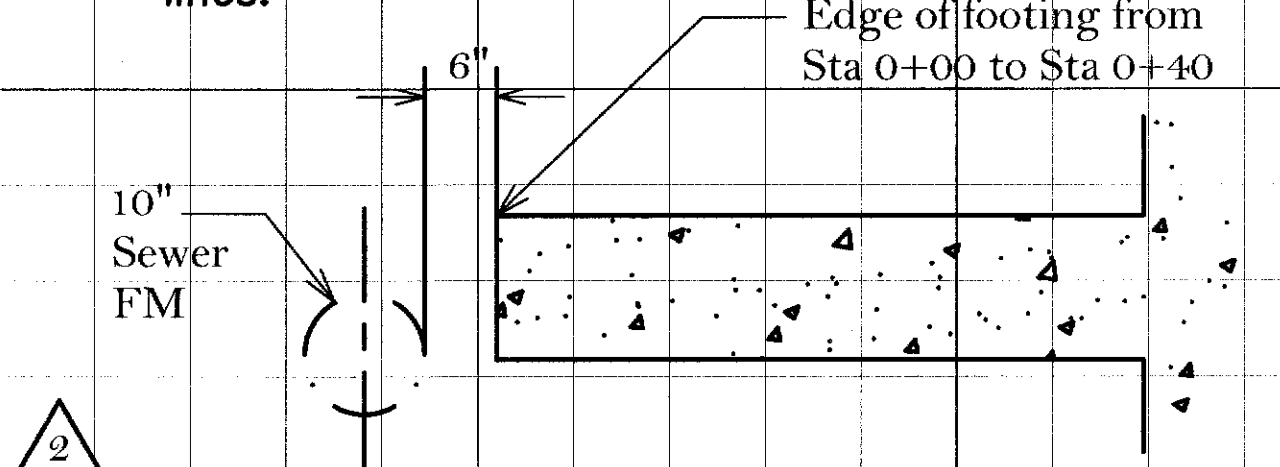


**SITE & GRADING PLAN 1 - KAUMUALII HIGHWAY**  
Scale: 1"=10'



**PROFILE - KAUMUALII HIGHWAY RETAINING WALL**  
Scale: HORIZ. 1"=10' VERT. 1"=2'

- Kauai Island Utility Cooperative (KIUC) Notes:**
1. Kauai Island Utility Cooperative's (KIUC) pole, guy and anchor locations shall be maintained at all times except as noted.
  2. If KIUC's facilities are affected by the new work, contractor shall notify KIUC inspector at 246-4343 for coordination.
  3. The contractor shall be responsible for all cost to adjust or relocate KIUC's facilities.
  4. A minimum of 15 feet radial clearance is required when working within the vicinity of energized overhead electrical lines.



**CONC. RET. WALL FTG. EDGE ADJUSTMENT FROM STA 0+00 TO STA 0+40**  
Not to scale

APPROVED:

CHIEF, DIVISION OF WASTEWATER MANAGEMENT  
DEPT. OF PUBLIC WORKS  
COUNTY OF KAUAI

**Wall Curve Data**

- (A)
- $\Delta = 23^\circ 04' 51''$
  - $\Delta/2 = 11^\circ 32' 26''$
  - $R = 581.50'$
  - $T = 118.74'$
  - $C = 232.67'$
  - $L_c = 234.25'$

**Power Pole Notes:**

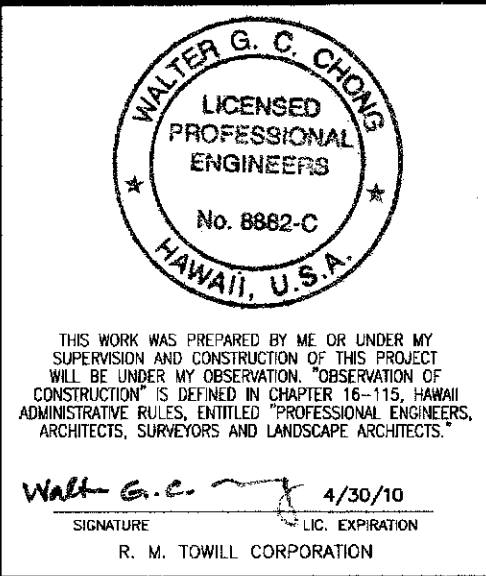
1. Power pole shall remain in its original location, except as noted. Coordinate with KIUC if power pole needs to be relocated.
2. Contractor shall ensure the specified shotcrete thicknesses are achieved in the vicinity of the pole.

**Shotcrete Notes:**

1. Backfill beneath shotcrete, where required, shall be
2. CLSM or Class D concrete. Shotcrete shall not extend beyond R/W.

LEGEND FOR AS-BUILT POSTINGS		
	Squiggly line for as-built deletion	
	Double line for as-built deletion	
	Text for as-built posting	

DATE	REVISION
2/19/10	As Built
6/16/08	Added Note & approval block. Revised wall callout.

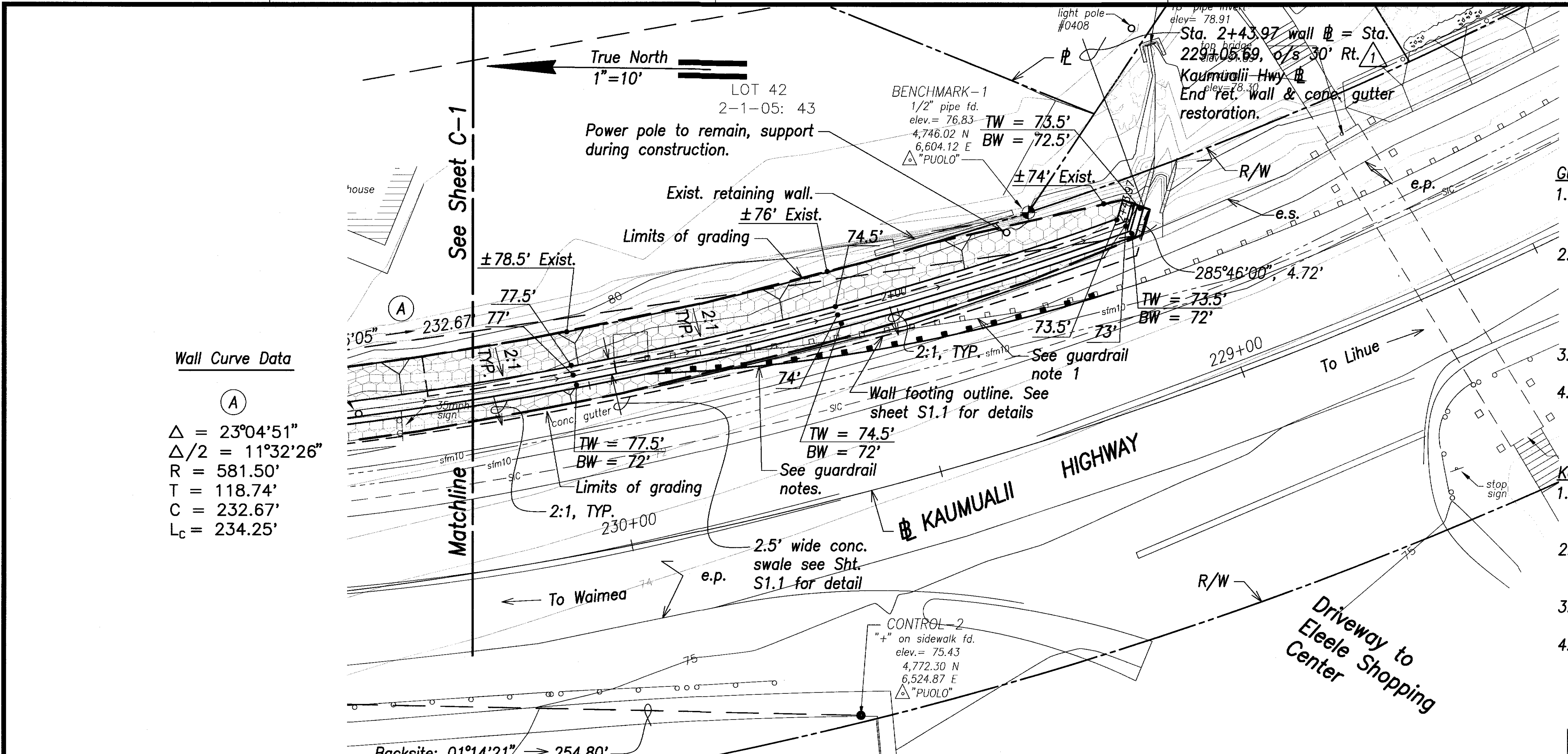


STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**SITE & GRADING PLAN 1 - KAUMUALII HIGHWAY**  
*Kaumualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03  
Scale: AS NOTED Date: MAY 2008

DESIGNED BY	DATE
NOTED BY	
CHECKED BY	
APPROVED BY	



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	ADD. 1	37



Wall Curve Data

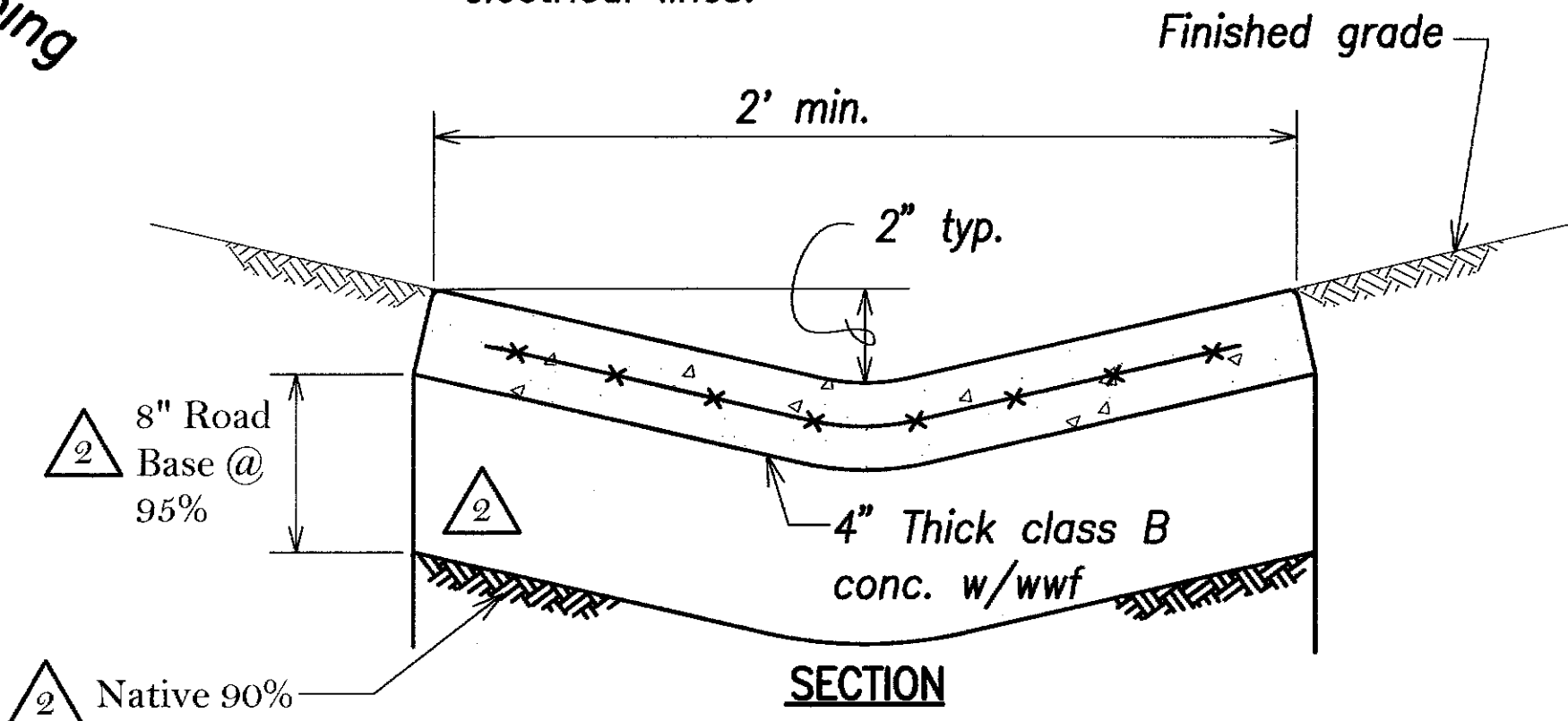
(A)  
Δ = 23°04'51"  
Δ/2 = 11°32'26"  
R = 581.50'  
T = 118.74'  
C = 232.67'  
L<sub>c</sub> = 234.25'

Guardrail Notes:

1. Sta. 229+70± (o/s 25' Rt.) to Sta. 229+95±, (o/s ±29' Rt.) Remove 75 LF exist. guardrail, steel posts, and concrete anchor block.
2. Sta. 229+70 (o/s 25' Rt.) to Sta. 229+92 (o/s 26' Rt.) Install 75 LF new guardrail (12.5 LF Thrie beam & 62.5 LF W-beam). Attach end of guardrail to retaining wall according to structural detail.
3. Guardrail posts not to be installed at Δ of concrete gutter.
4. For wall connection detail see sht. S1.1.

Kauai Island Utility Cooperative Notes:

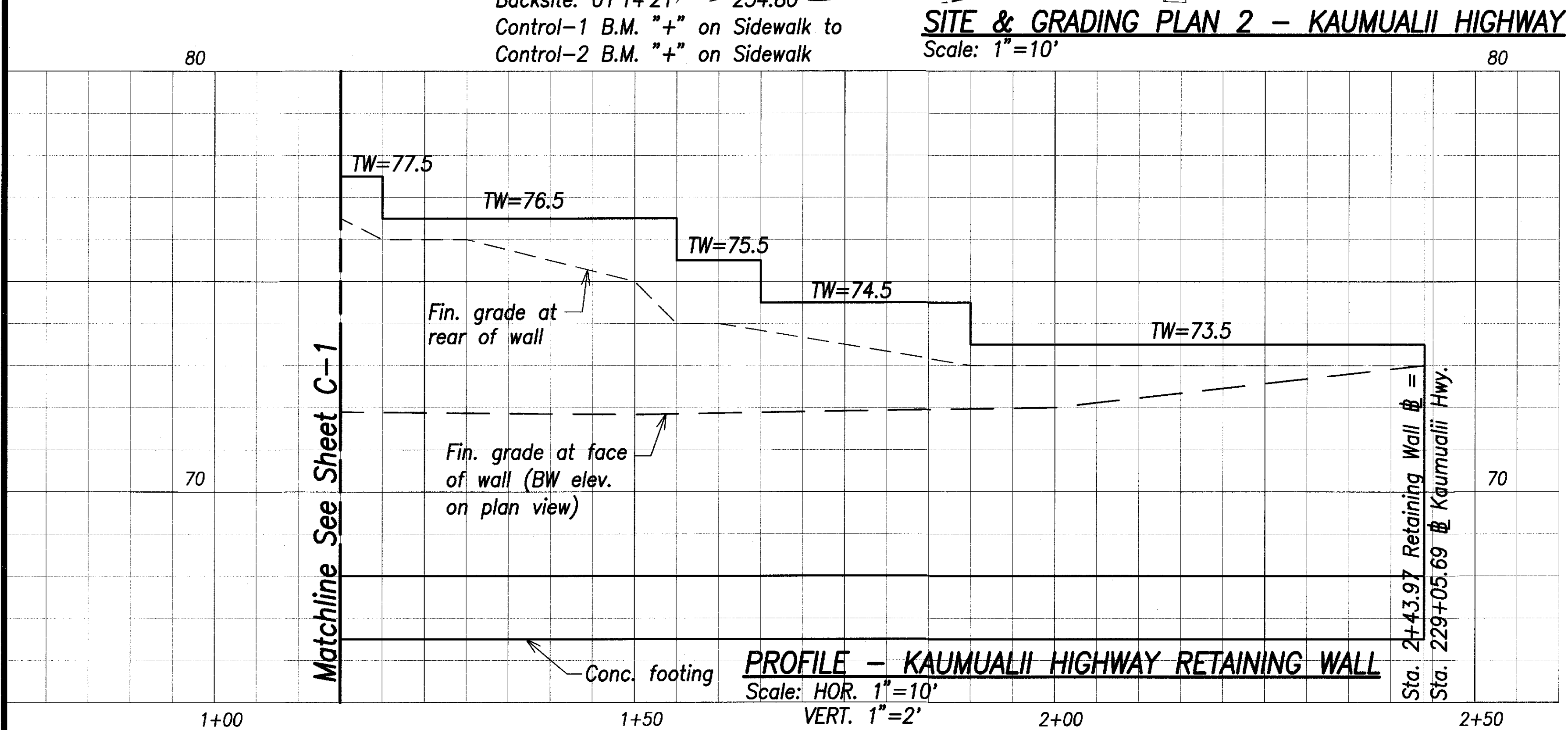
1. Kauai Island Utility Cooperative's (KIUC) pole, guy and anchor locations shall be maintained at all times, except as noted.
2. If KIUC's facilities are affected by the new work, contractor shall notify KIUC inspector at 246-4343 for coordination.
3. The contractor shall be responsible for all cost to adjust or relocate KIUC's facilities.
4. A minimum of 15 feet radial clearance is required when working within the vicinity of energized overhead electrical lines.



SECTION CONCRETE GUTTER RESTORATION

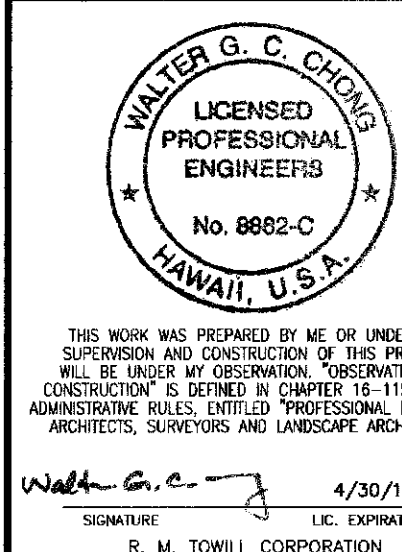
2/19/10	2	As Built
6/16/08	1	Revised wall callout.
DATE		REVISION

SURVEY PLANNED BY	DATE
DRAWN BY	BY
DESIGNED BY	TC
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
ADD. 11/09	
No.	



LEGEND FOR AS-BUILT POSTINGS

- ~~~~~ Squiggly line for as-built deletion
- ==== Double line for as-built deletion
- Roadway Text for as-built posting



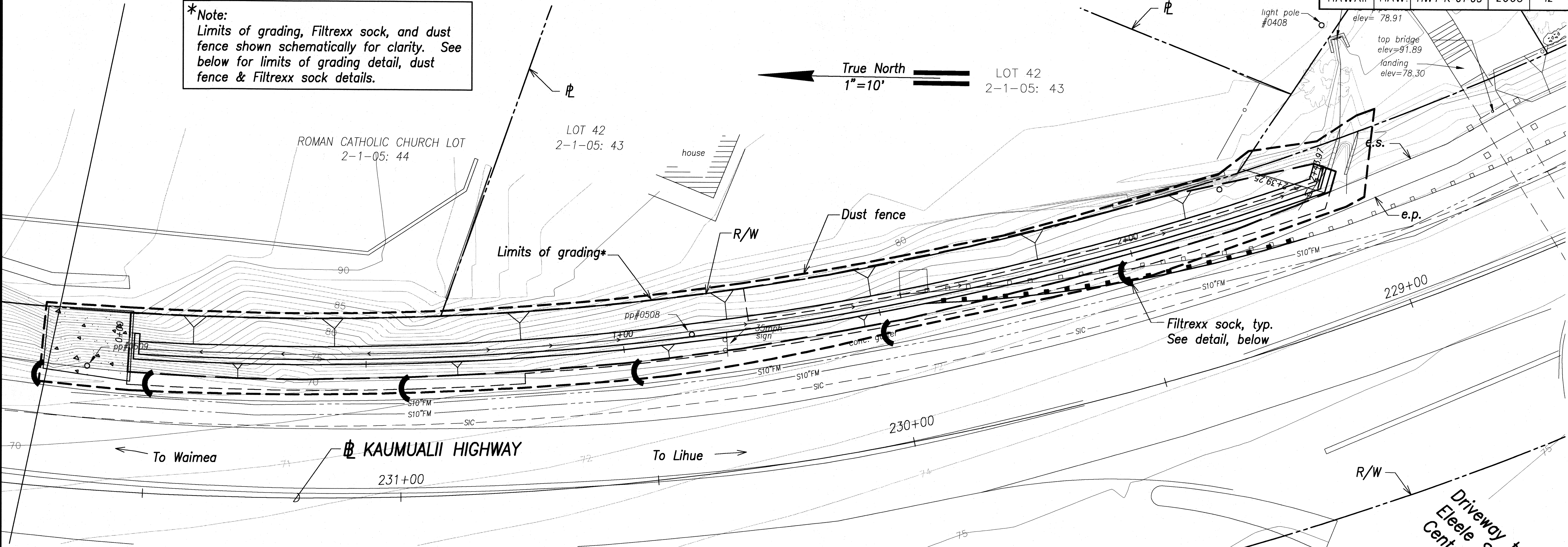
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**SITE & GRADING PLAN 2 - KAUMUALII HIGHWAY**  
*Kaumualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls*  
*Project No. HWY-K-01-03*

Scale: AS NOTED Date: MAY 2008

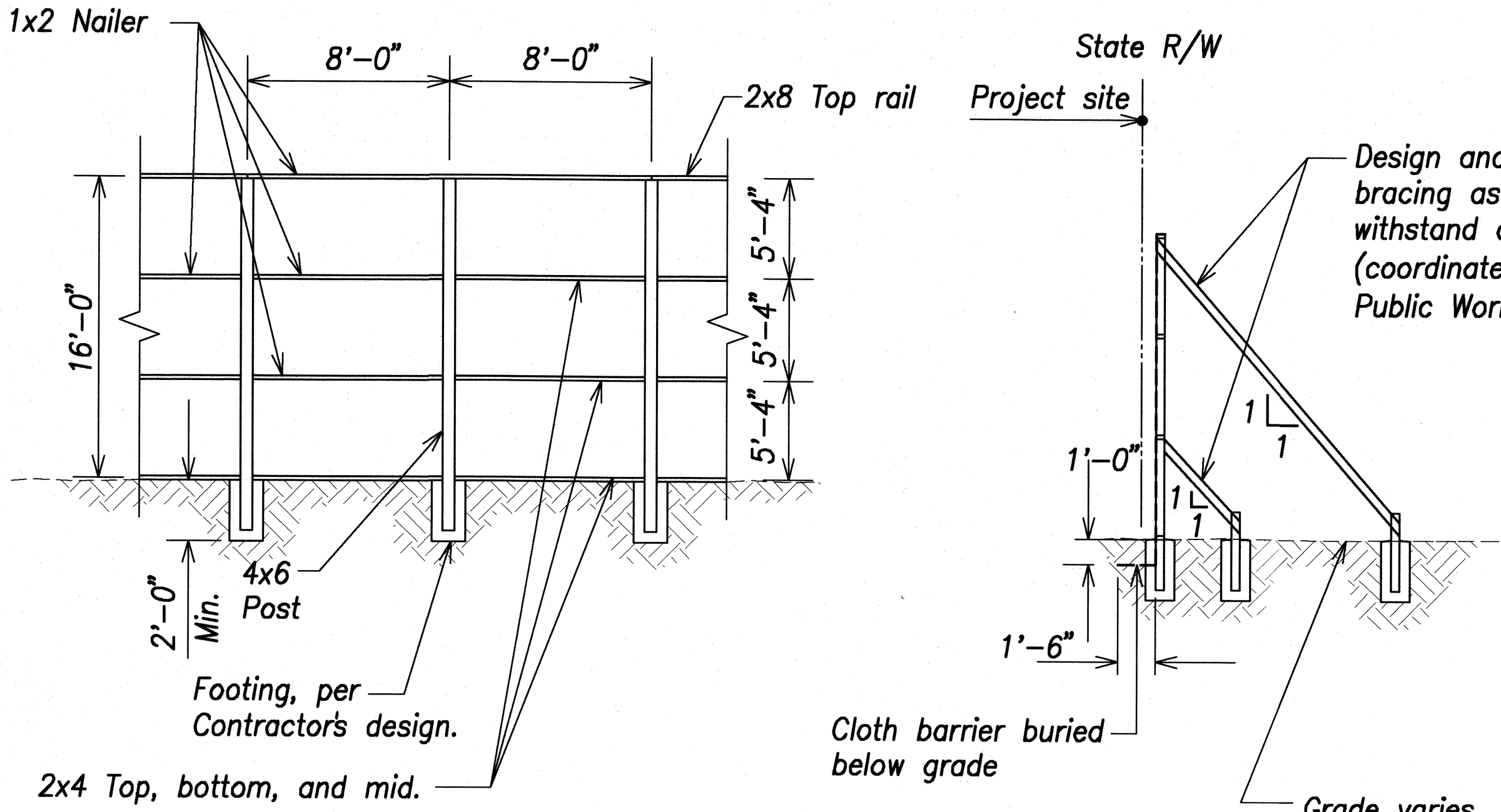


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	12	37

**\*Note:**  
Limits of grading, Filtrexx sock, and dust fence shown schematically for clarity. See below for limits of grading detail, dust fence & Filtrexx sock details.



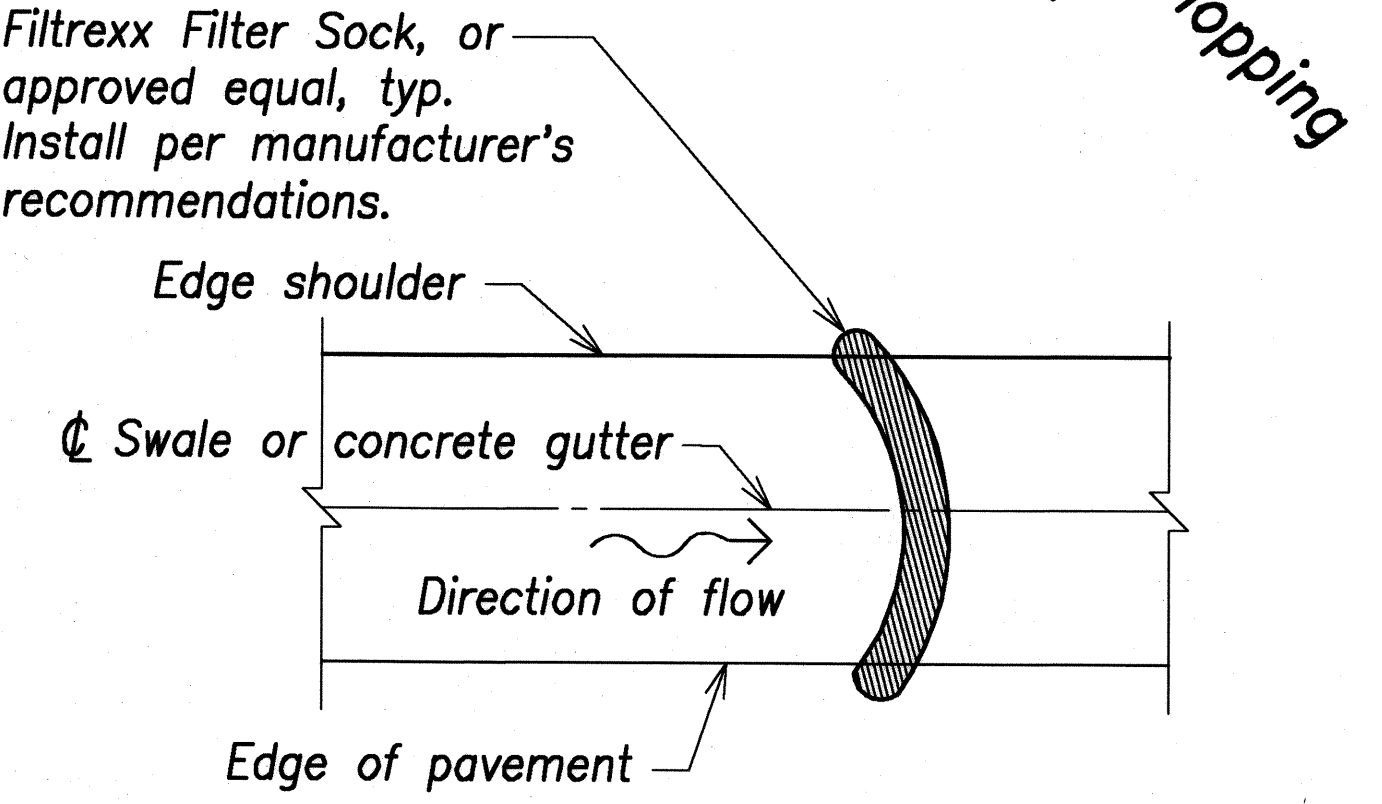
**EROSION CONTROL PLAN – KAUMUALII HIGHWAY**  
SCALE 1"=10'



**DUST FENCE DETAIL**  
Not to scale

**LIMITS OF GRADING DETAIL**  
Not to scale

- Dust Fence Notes:**
1. Cloth barrier not shown in front view.
  2. Cloth barrier to be a "woven geotextile".
  3. Lumber sizes are nominal inches as shown.
  4. Cloth to be buried at base to indicated dimension.
  5. 1x2 cloth barrier caps to be nailed 12" o.c.
  6. Burlap is not acceptable as the cloth barrier.
  7. Cloth to have no horizontal seams.
  8. Vertical seams to be made over uprights only.
  9. All seams to be capped with minimum of 1x2.
  10. All joints to be securely fastened by mechanical means.
  11. Submit shop drawings with Structural Engineer's stamp & calculations for review and approval by Engineer.



**TYPICAL ROADWAY SWALE FILTER SOCK**  
Not to scale

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

WALTER G. C. WONG  
LICENSED PROFESSIONAL ENGINEER  
No. 8882-C  
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION OF CONSTRUCTION IS DEFINED IN CHAPTER 18-115, HAWAII ADMINISTRATIVE RULES, ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

SIGNATURE: *Walter G. C. Wong* DATE: 4/30/10  
R. M. TOWILL CORPORATION

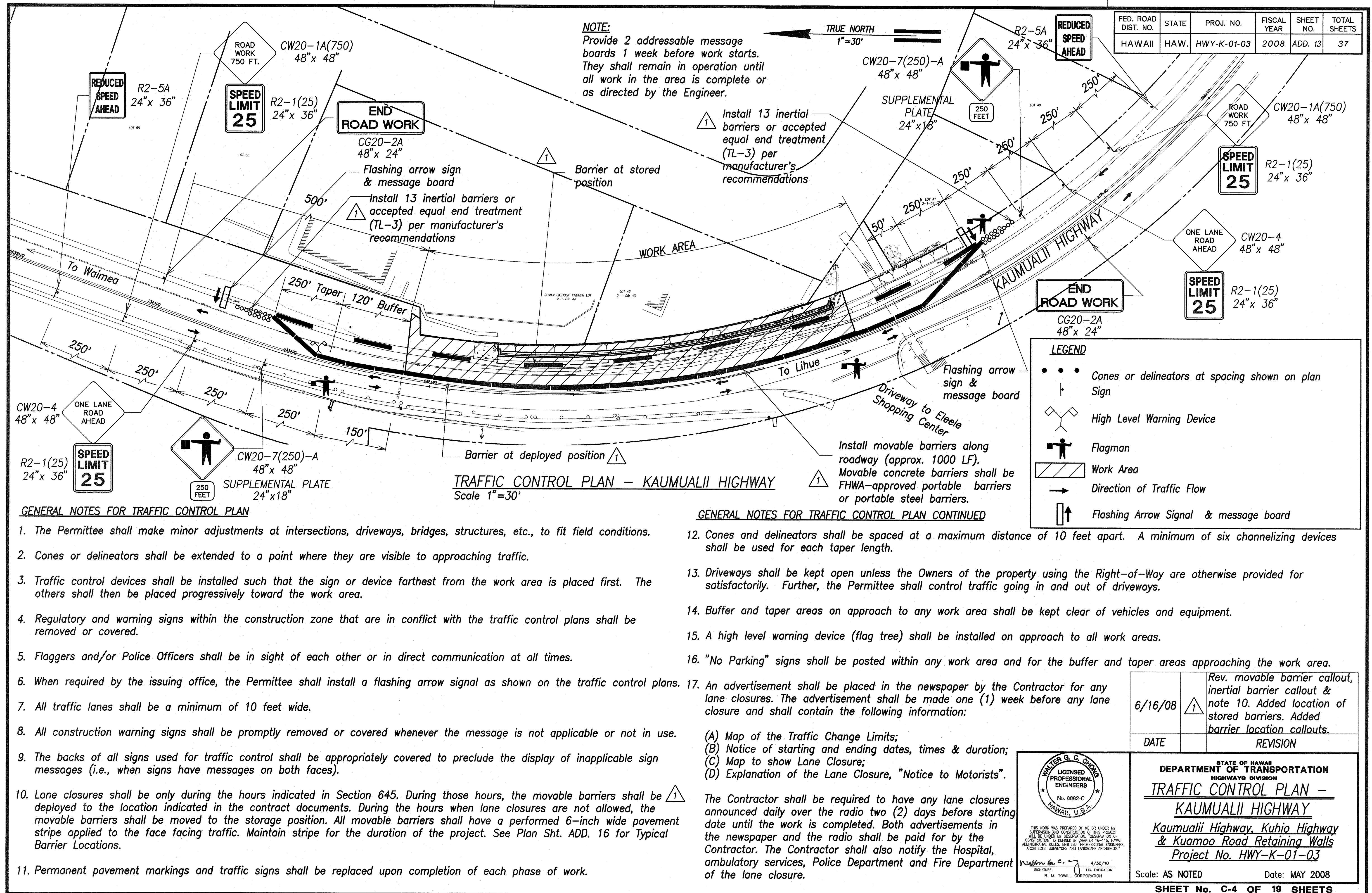
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**EROSION CONTROL PLAN – KAUMUALII HIGHWAY**

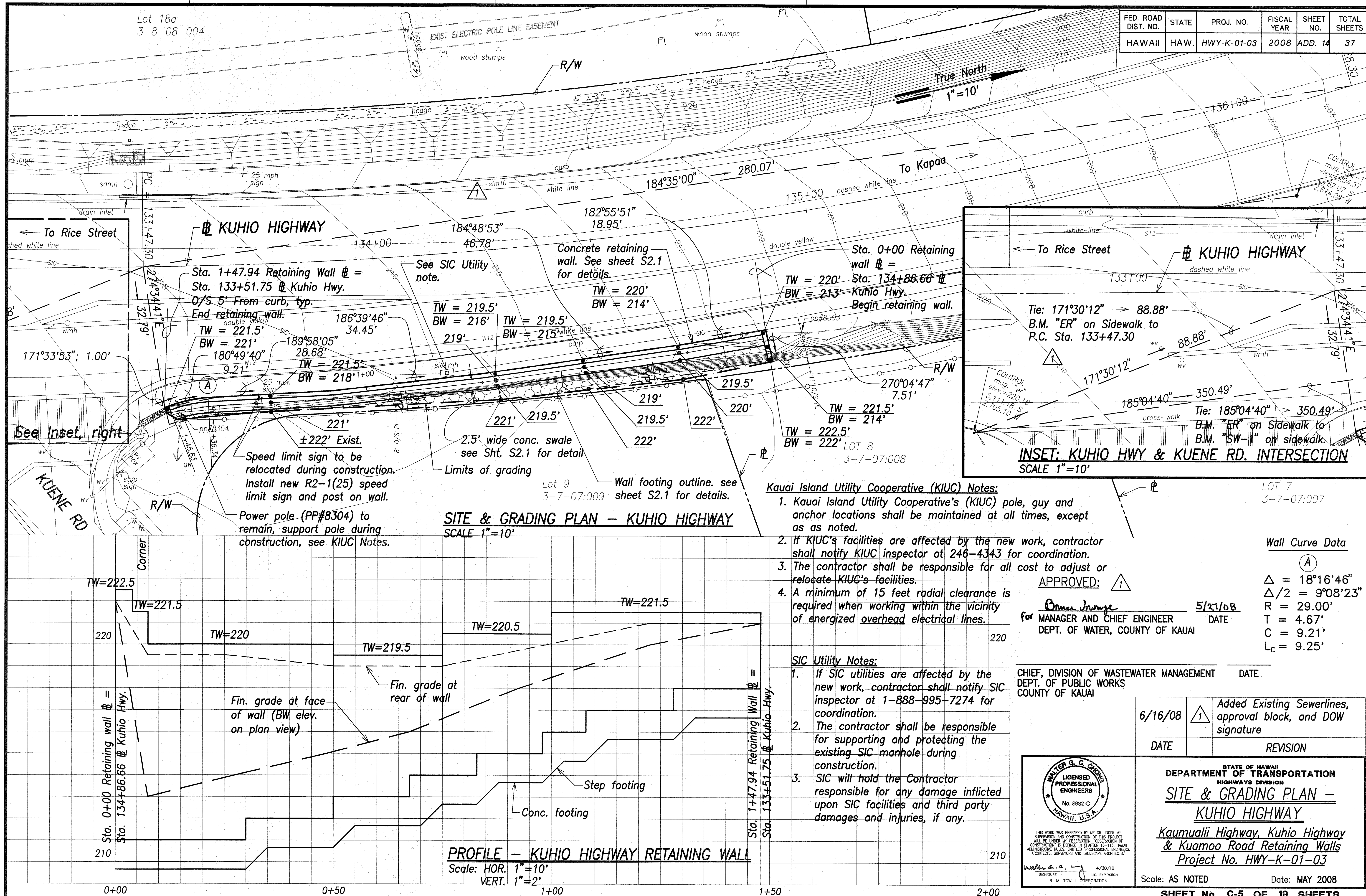
*Kaumualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

Scale: AS NOTED Date: MAY 2008



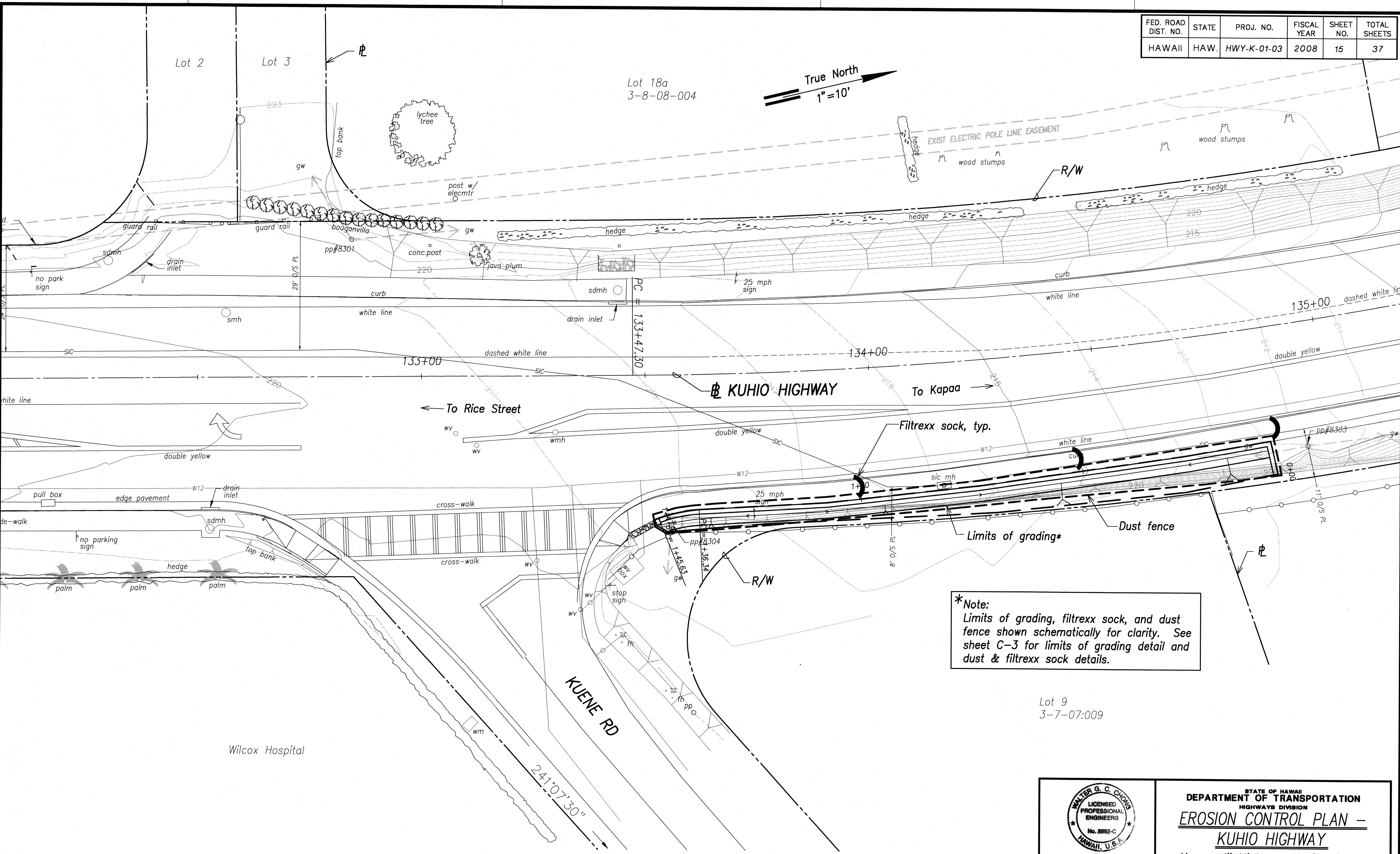








FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	15	37



**\*Note:**  
Limits of grading, filter sock, and dust fence shown schematically for clarity. See sheet C-3 for limits of grading detail and dust & filter sock details.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	BY
	NOTED BY	WC
	CHECKED BY	

**EROSION CONTROL PLAN – KUHIO HIGHWAY**  
SCALE 1"=10'

Walter G. C. O'Neil  
4/30/10  
R. M. TOWELL CORPORATION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**EROSION CONTROL PLAN –  
KUHIO HIGHWAY**

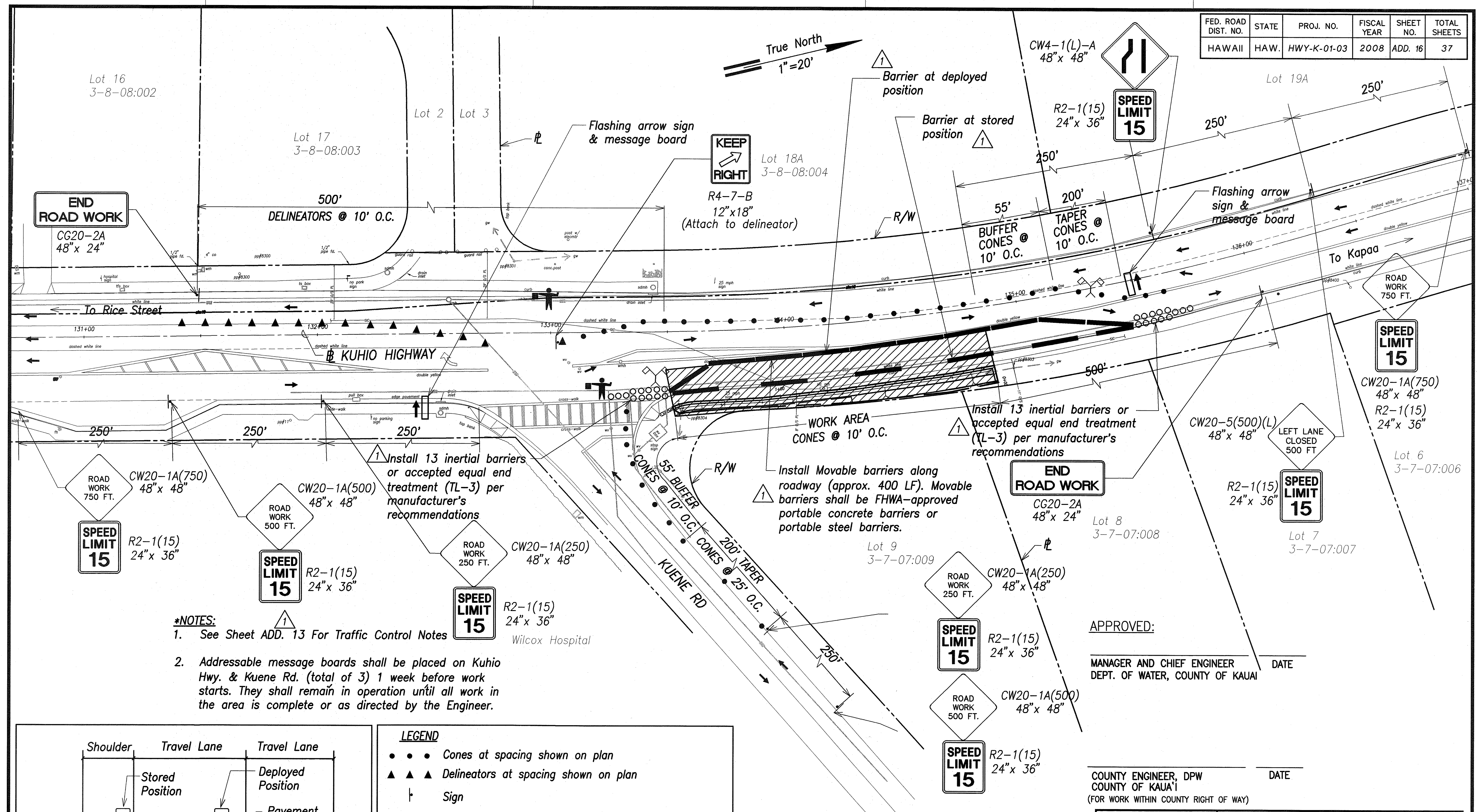
*Kaunualii Highway, Kuhio Highway  
& Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

Scale: AS NOTED      Date: MAY 2008

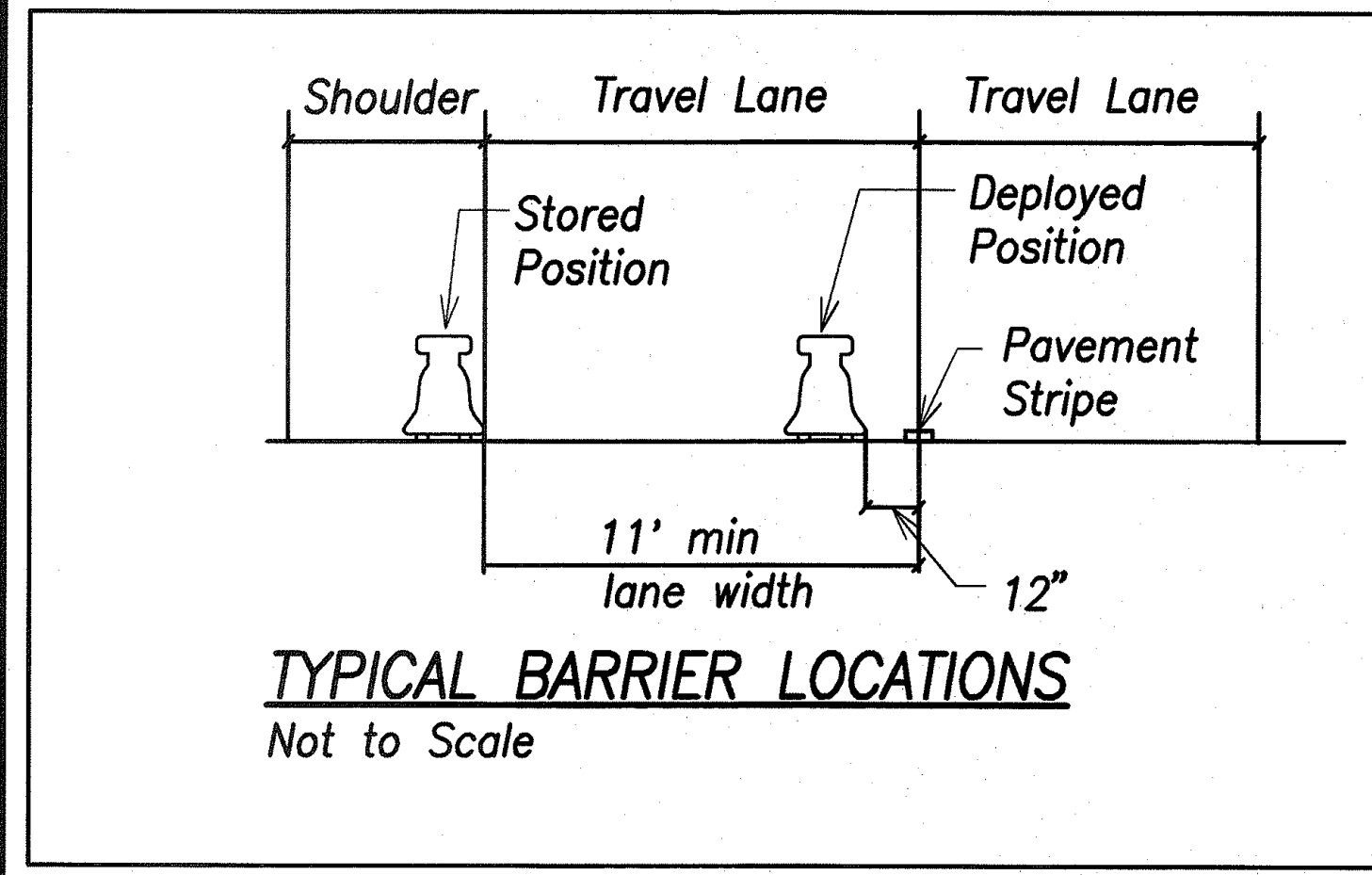
**SHEET No. C-6 OF 19 SHEETS**



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	ADD. 16	37



- \*NOTES:**
1. See Sheet ADD. 13 For Traffic Control Notes
  2. Addressable message boards shall be placed on Kuhio Hwy. & Kuene Rd. (total of 3) 1 week before work starts. They shall remain in operation until all work in the area is complete or as directed by the Engineer.



- LEGEND**
- • • Cones at spacing shown on plan
  - ▲ ▲ ▲ Delineators at spacing shown on plan
  - ⊥ Sign
  - ⚡ High Level Warning Device
  - ⚓ Flagman
  - ▨ Work Area
  - Direction of Traffic Flow
  - ⬆ Flashing Arrow Signal & message board

**TRAFFIC CONTROL PLAN - KUHIO HIGHWAY**  
Scale 1"=20' TMK: 3-7-07

6/16/08	1	Rev. movable barrier callout, inertial barrier callout & Note 1. Added location of stored barriers, typical barrier section & barrier location callouts.
DATE		REVISION

APPROVED:

MANAGER AND CHIEF ENGINEER  
DEPT. OF WATER, COUNTY OF KAUAI

COUNTY ENGINEER, DPW  
COUNTY OF KAUAI

DATE

DATE

(FOR WORK WITHIN COUNTY RIGHT OF WAY)

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. 'OBSERVATION OF CONSTRUCTION' IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES, DUTIES OF PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS.

Walter G. C. O'Neil  
L.I.C. CORPORATION  
R. M. TOWELL CORPORATION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**TRAFFIC CONTROL PLAN - KUHIO HIGHWAY**

*Kaunualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

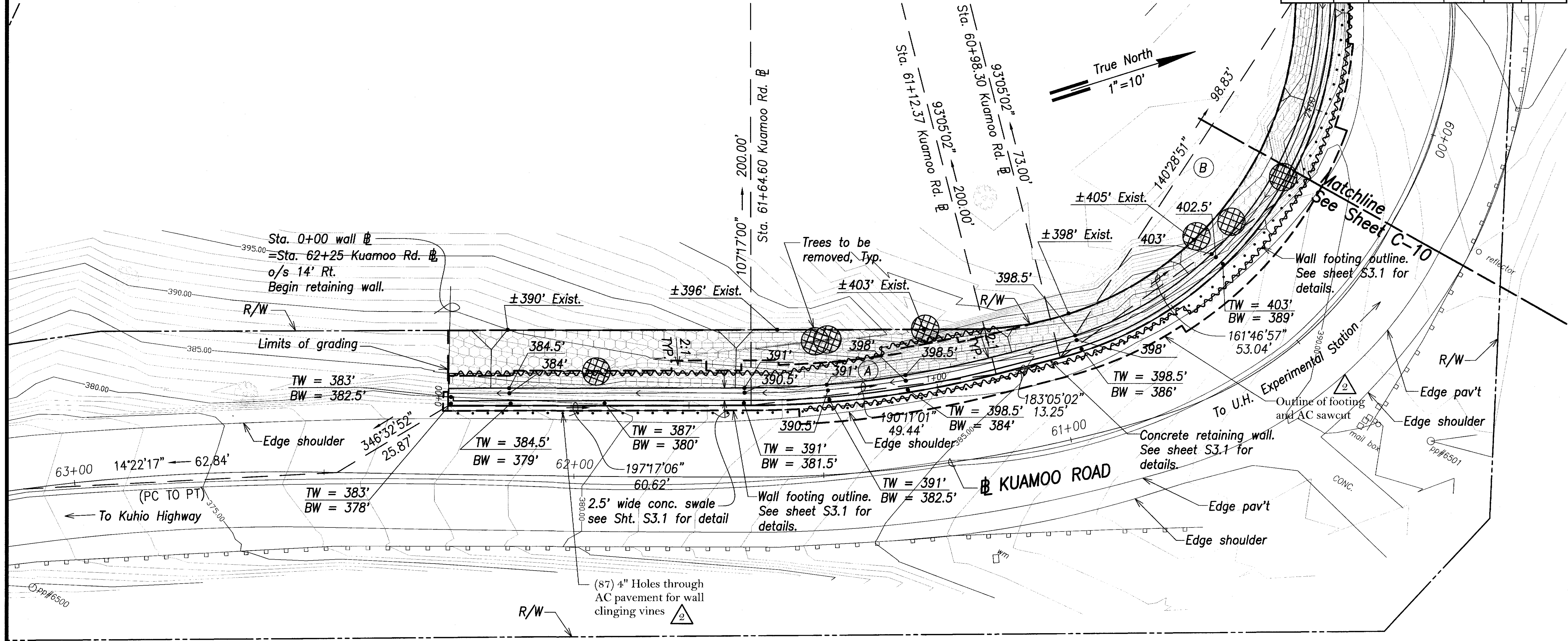
Scale: AS NOTED Date: MAY 2008

SHEET No. C-7 OF 19 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	REV
CHECKED BY	VC
NOTED BY	
ADD. 16.dgn	
No.	



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	17	37



**SITE & GRADING PLAN 1 - KUAMOO ROAD**  
Scale 1"=10'

- Kauai Island Utility Cooperative Notes:**
1. Kauai Island Utility Cooperative's (KIUC) pole, guy and anchor locations shall be maintained at all times, except as noted.
  2. If KIUC's facilities are affected by the new work, contractor shall notify KIUC inspector at 246-4343 for coordination.
  3. The contractor shall be responsible for all cost to adjust or relocate KIUC's facilities.
  4. A minimum of 15 feet radial clearance is required when working within the vicinity of energized overhead electrical lines.

**Wall Curve Data**

A	B
$\Delta = 14^{\circ}11'58''$	$\Delta = 85^{\circ}12'22''$
$\Delta/2 = 7^{\circ}05'59''$	$\Delta/2 = 42^{\circ}36'11''$
R = 200.00'	R = 73.00'
T = 24.91'	T = 67.13'
C = 49.44'	C = 98.83'
L <sub>c</sub> = 49.57'	L <sub>c</sub> = 108.56'

**LEGEND FOR AS-BUILT POSTINGS**

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway Text for as-built posting

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION OF CONSTRUCTION IS DEFINED IN CHAPTER 18-115, HAWAII ADMINISTRATIVE RULES, ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."  
Walter G. C. Ciddio 4/30/10  
SIGNATURE L.C. EXPIRATION  
R. M. TOWELL CORPORATION

2/19/10		As Built
DATE	REVISION	

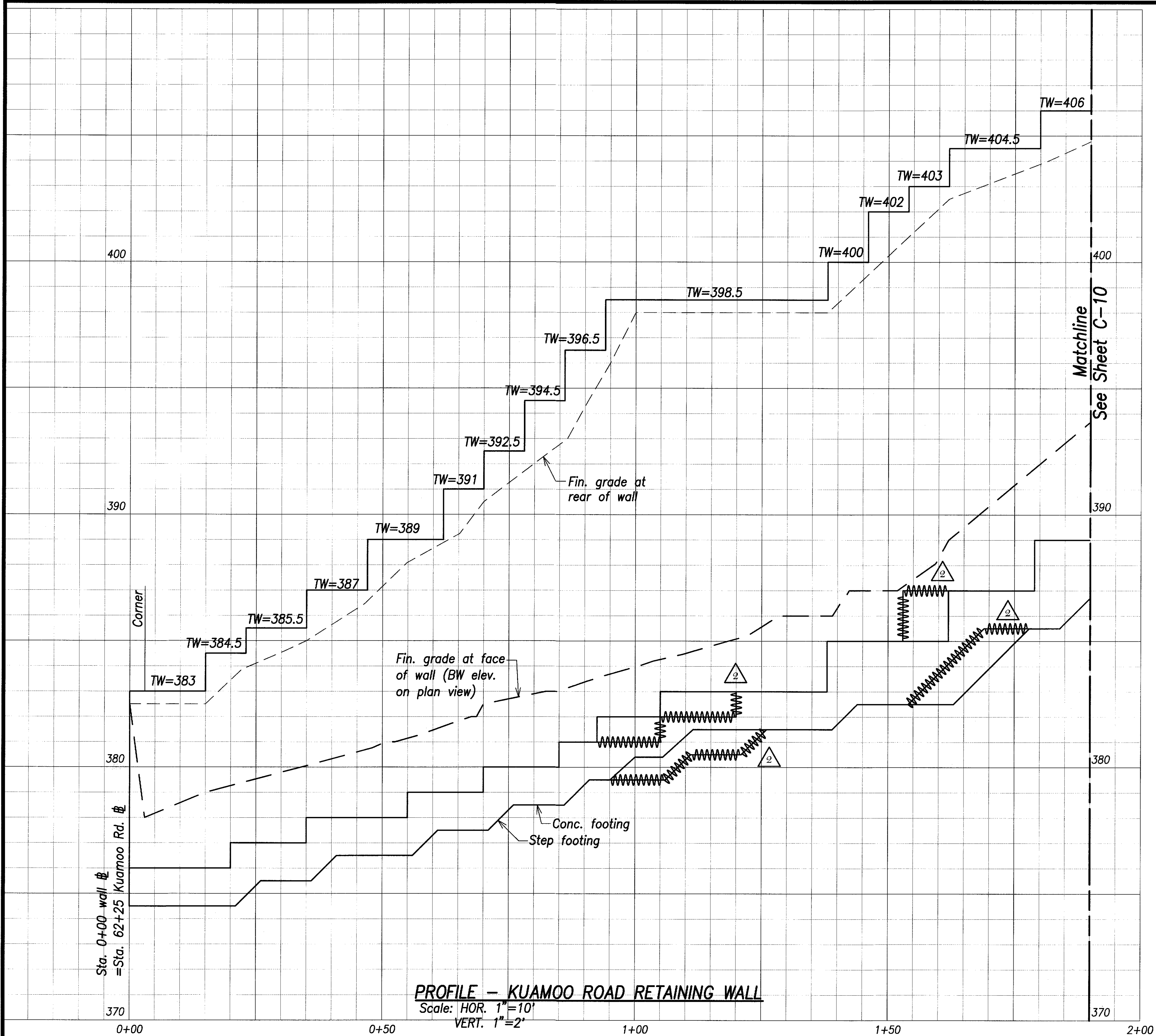
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**SITE & GRADING PLAN 1 - KUAMOO ROAD**  
*Kaumualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03  
Scale: AS NOTED Date: MAY 2008  
**SHEET No. C-8 OF 19 SHEETS**

DATE	BY	TC
DESIGNED BY	DESIGNED BY	DESIGNED BY
QUANTITIES BY	QUANTITIES BY	QUANTITIES BY
CHECKED BY	CHECKED BY	CHECKED BY
ORIGINAL PLAN	NOTE BOOK	MEMORANDUM
No.	No.	No.



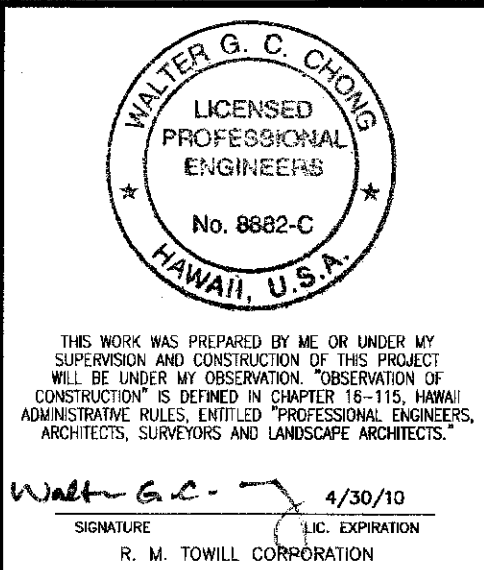
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	18	37

SURVEY PLOTTED BY	DATE
DRAWN BY	REV
TRACED BY	NO
NOTED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
misc/road/01.dwg	
No.	



LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

2/19/10		As Built
DATE		REVISION



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

### PROFILE KUAMOO ROAD

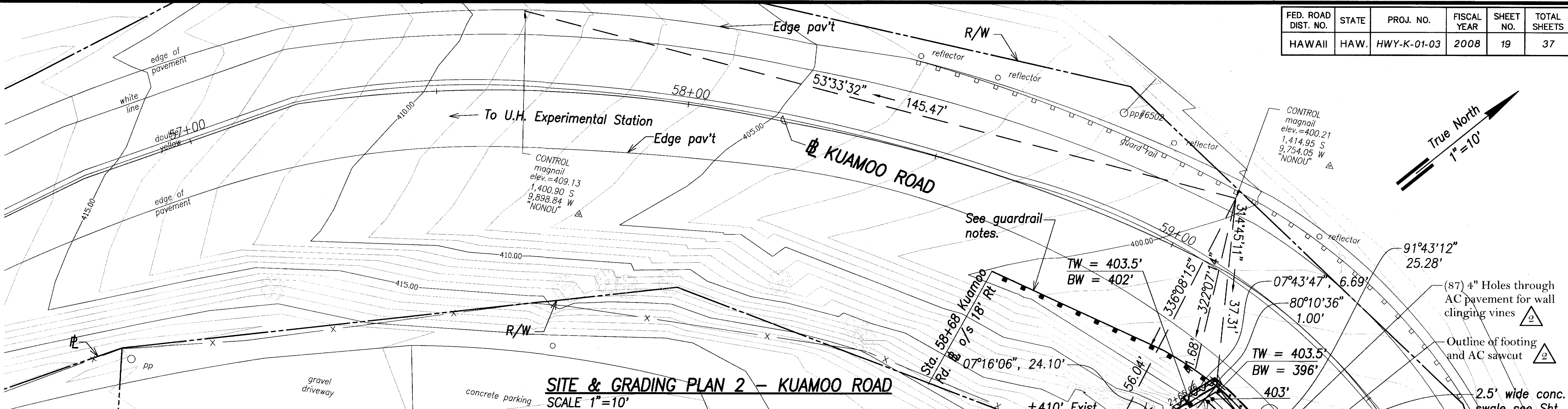
*Kaumualii Highway, Kuhio Highway  
& Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

Scale: AS NOTED
Date: MAY 2008

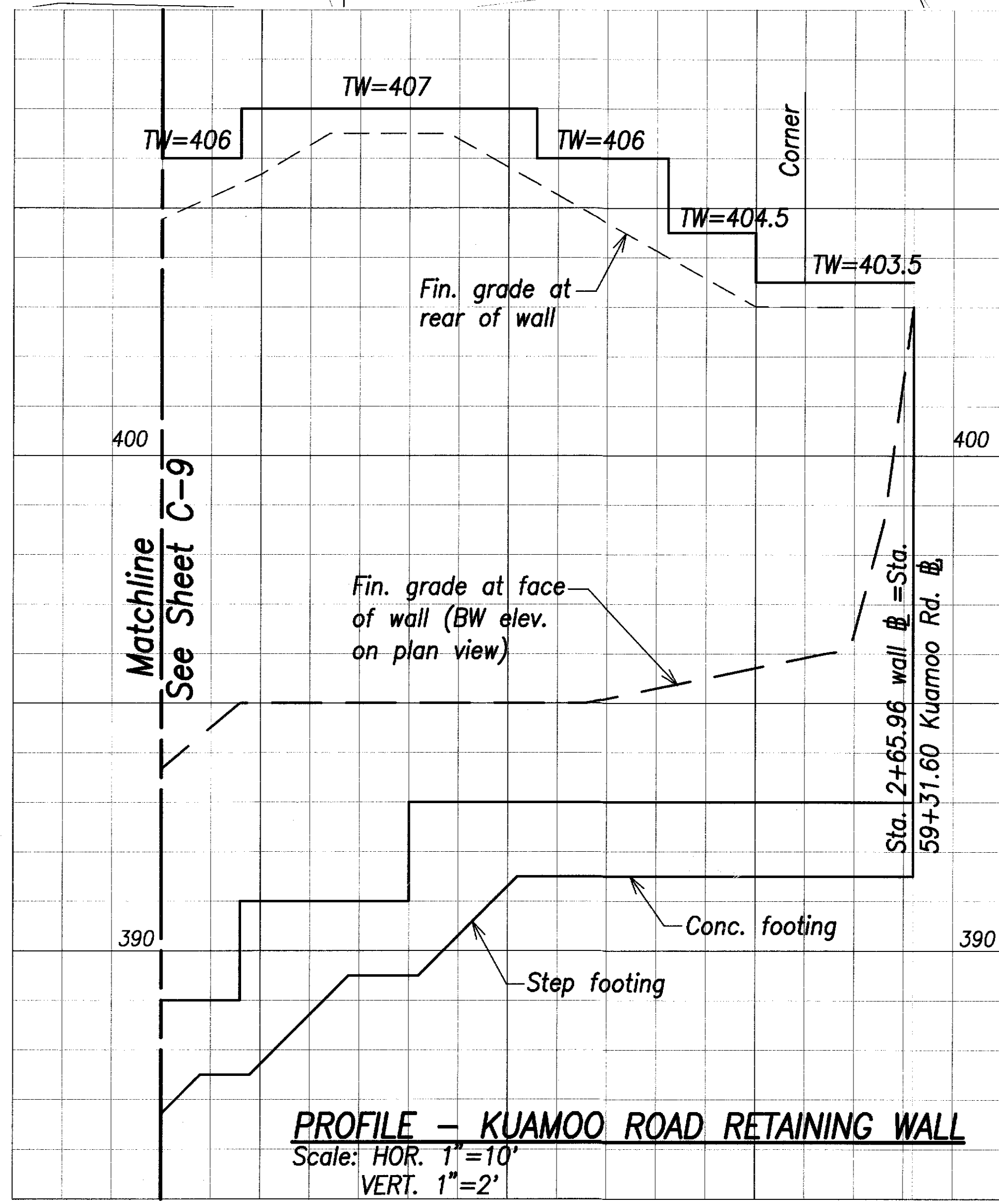
SHEET No. C-9 OF 19 SHEETS



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	19	37



**SITE & GRADING PLAN 2 - KUAMOO ROAD**  
SCALE 1"=10'



**PROFILE - KUAMOO ROAD RETAINING WALL**  
Scale: HOR. 1"=10' VERT. 1"=2'

Sta. 2+65.96 wall @ Sta. 59+31.60 Kuamoo Rd. @ o/s 20' Rt. End retaining wall.

**Wall Curve Data**

- (C)  
 $\Delta = 23^\circ 51' 05''$   
 $\Delta/2 = 11^\circ 55' 32''$   
 $R = 58.81'$   
 $T = 12.42'$   
 $C = 24.30'$   
 $L_c = 24.48'$

**Kauai Island Utility Cooperative Notes:**

1. Kauai Island Utility Cooperative's (KIUC) pole, guy and anchor locations shall be maintained at all times, except as noted.
2. If KIUC's facilities are affected by the new work, contractor shall notify KIUC inspector at 246-4343 for coordination.
3. The contractor shall be responsible for all cost to adjust or relocate KIUC's facilities.
4. A minimum of 15 feet radial clearance is required when working within the vicinity of energized overhead electrical lines.

**Guardrail Notes:**

1. @ Sta. 58+68± (o/s 18' Rt.) to @ Sta. 59+31.60, (o/s ±20' Rt.) Install 50 LF new guardrail (12.5 LF Thrie Beam & 37.5' FLEAT-350 end treatment). Attach end of guardrail to retaining wall according to structural detail, on sheet S1.1.

SURVEY PLOTTED BY	DATE
DRAWN BY	REV
TRACED BY	NO
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

**LEGEND FOR AS-BUILT POSTINGS**

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway Text for as-built posting

**WALTER G. C. CHONG**  
LICENSED PROFESSIONAL ENGINEERS  
No. 8882-C  
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION OF CONSTRUCTION IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES, ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

4/30/10  
R. M. TOWILL CORPORATION

2/19/10	As Built
DATE	REVISION

**STATE OF HAWAII**  
**DEPARTMENT OF TRANSPORTATION**  
**HIGHWAYS DIVISION**

**SITE & GRADING PLAN 2 - KUAMOO ROAD**

**Kaunualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls**

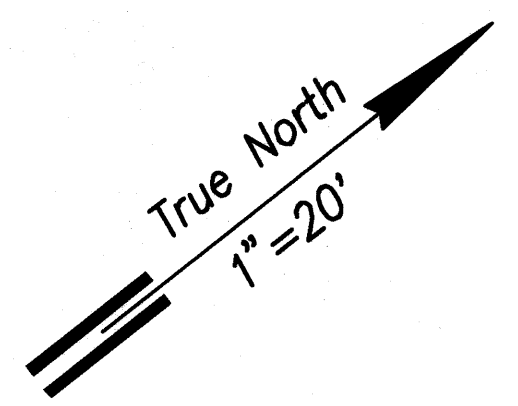
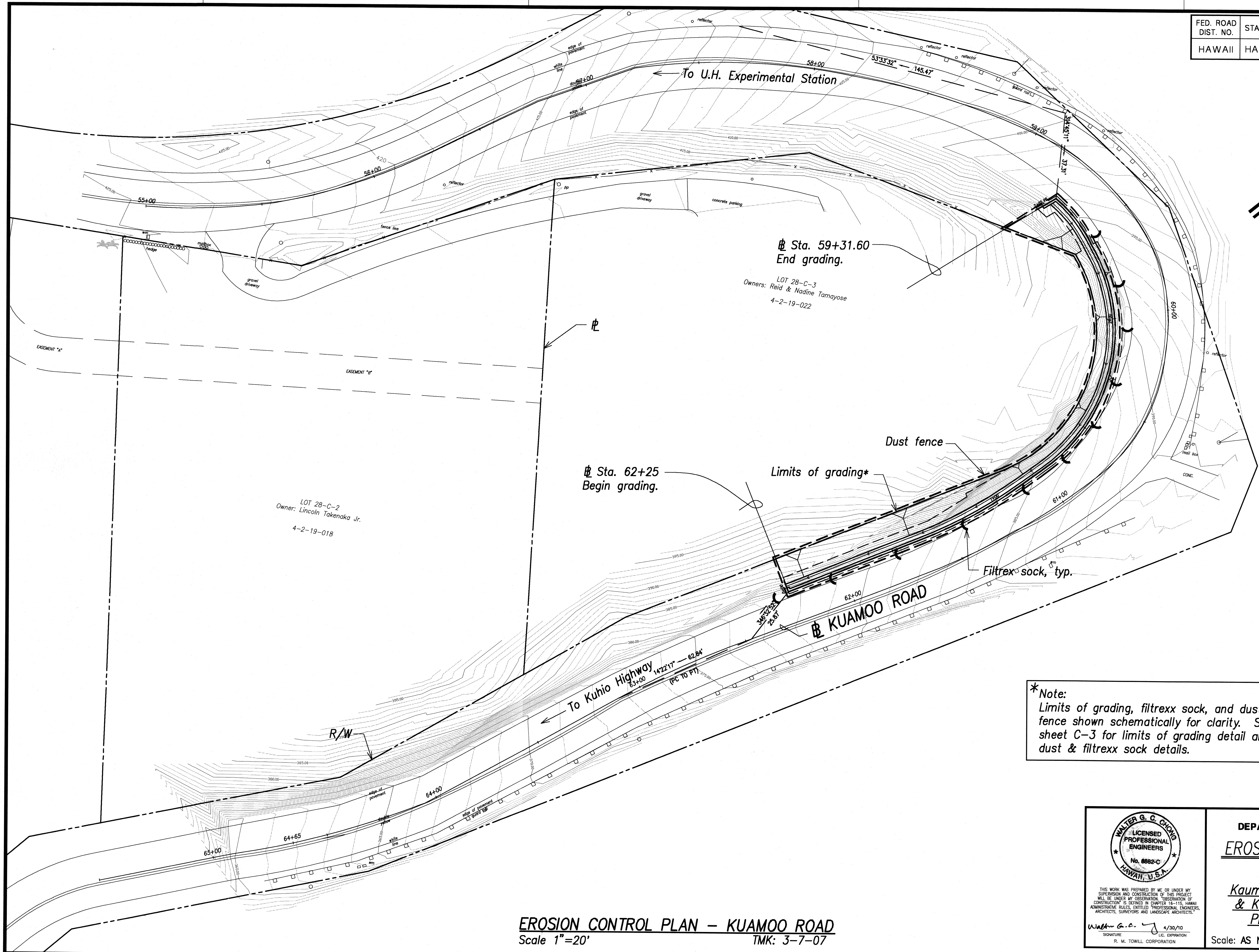
**Project No. HWY-K-01-03**

Scale: AS NOTED Date: MAY 2008

**SHEET No. C-10 OF 19 SHEETS**



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	20	37



\*Note:  
Limits of grading, filtrex sock, and dust fence shown schematically for clarity. See sheet C-3 for limits of grading detail and dust & filtrex sock details.

ORIGINAL PLAN	DATE
DESIGNED BY	BY
QUANTITIES BY	WC
CHECKED BY	
NOTE BOOK	
NO.	

**EROSION CONTROL PLAN – KUAMOO ROAD**  
Scale 1"=20' TMK: 3-7-07

WALTER G. C. CHONG  
LICENSED PROFESSIONAL ENGINEERS  
No. 6882-C  
HAWAII, U.S.A.

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Walter G. C. Chong  
SIGNATURE  
R. M. TOWILL CORPORATION  
LIC. EXPIRATION 4/30/10

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**EROSION CONTROL PLAN – KUAMOO ROAD**

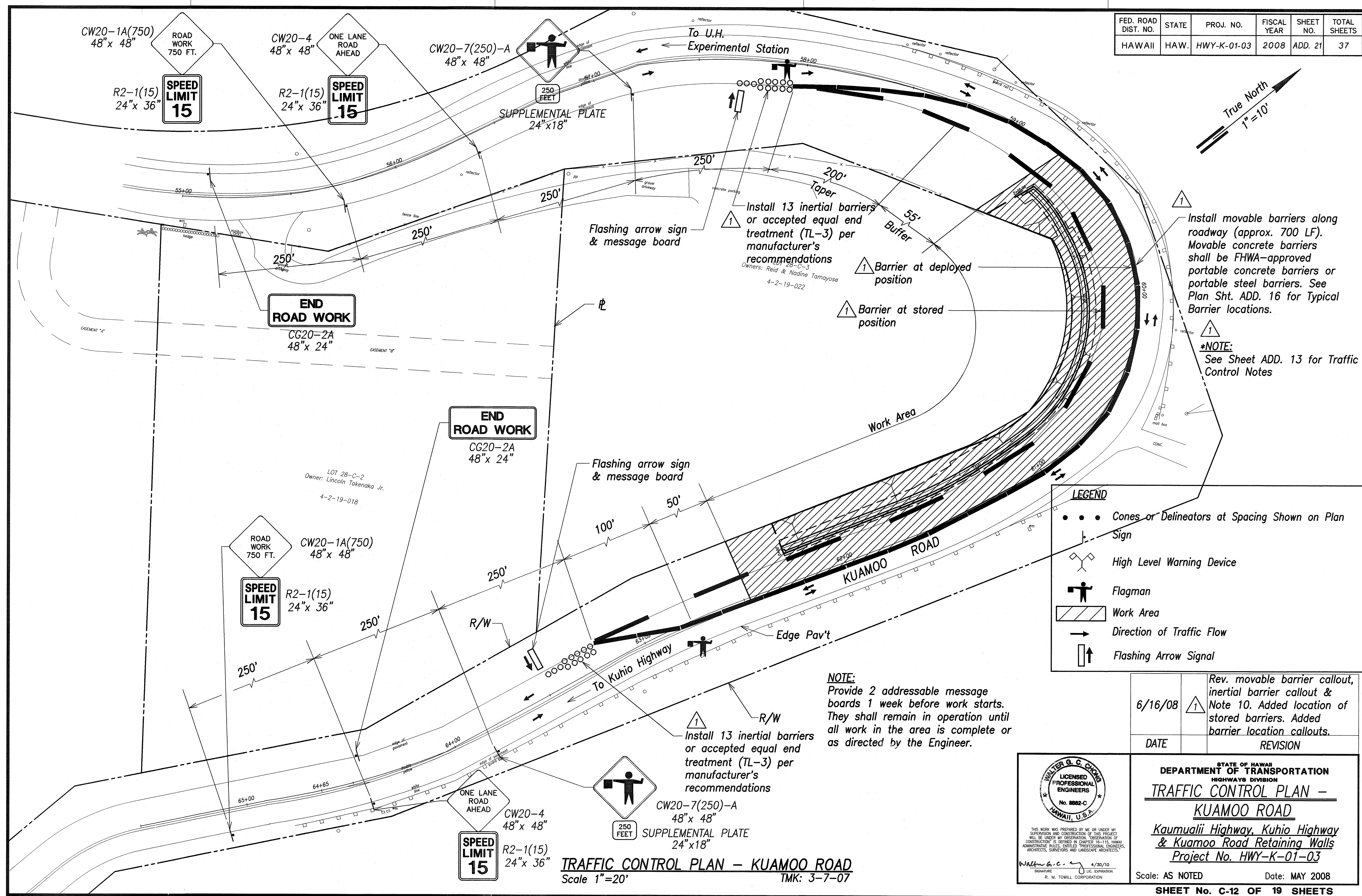
*Kaunualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

Scale: AS NOTED Date: MAY 2008

**SHEET No. C-11 OF 19 SHEETS**



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	ADD. 21	37

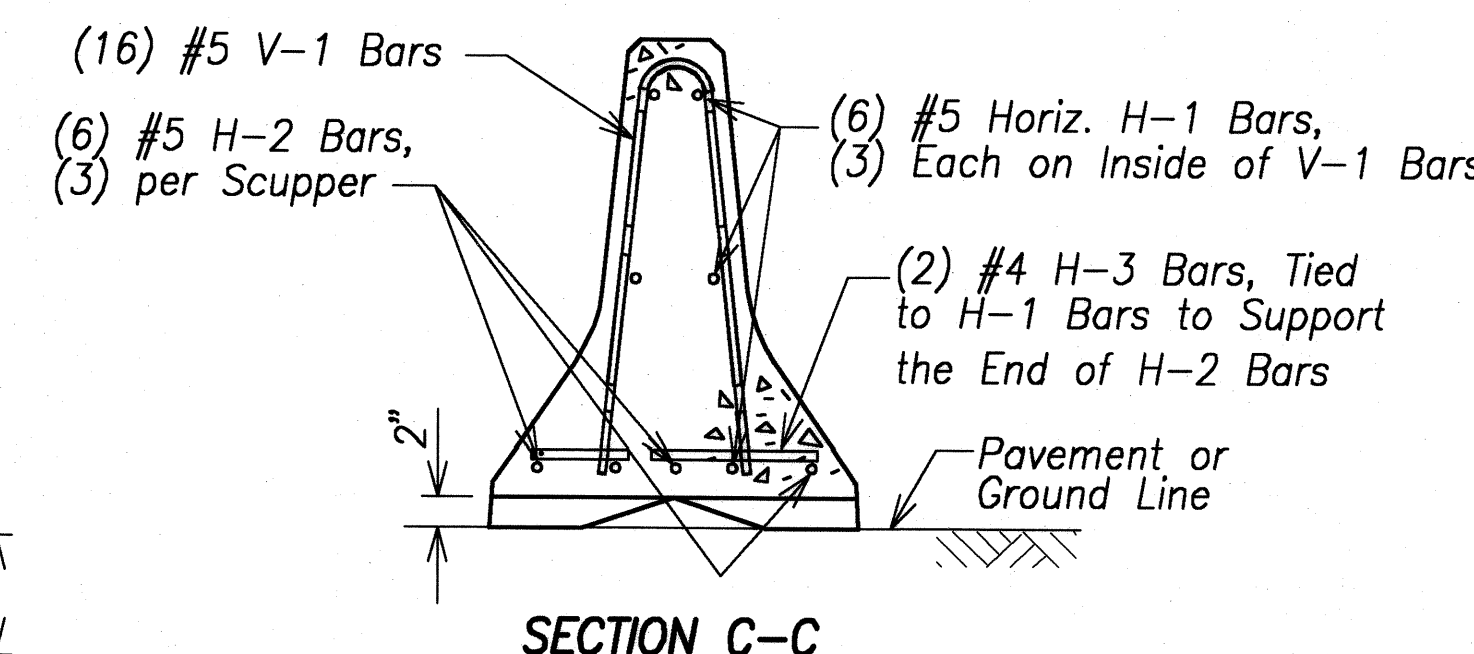
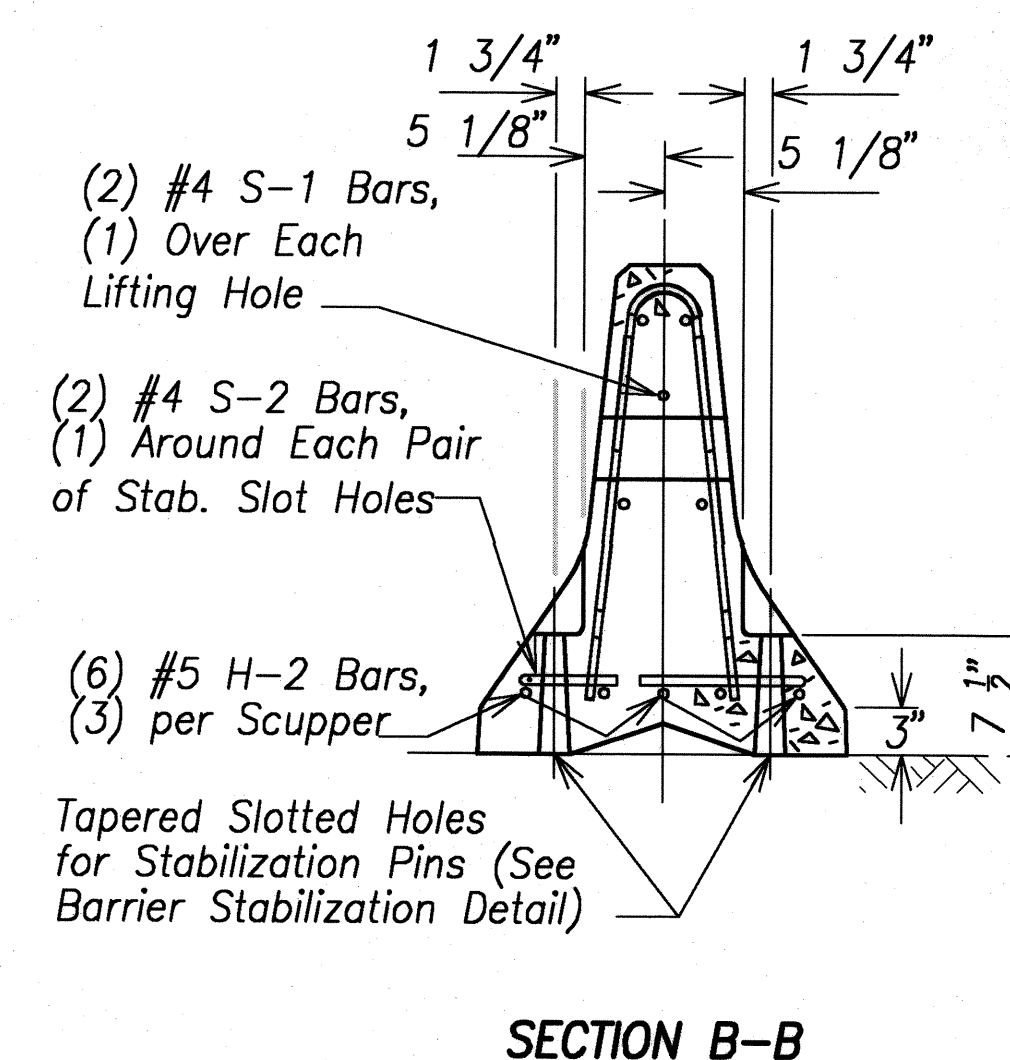
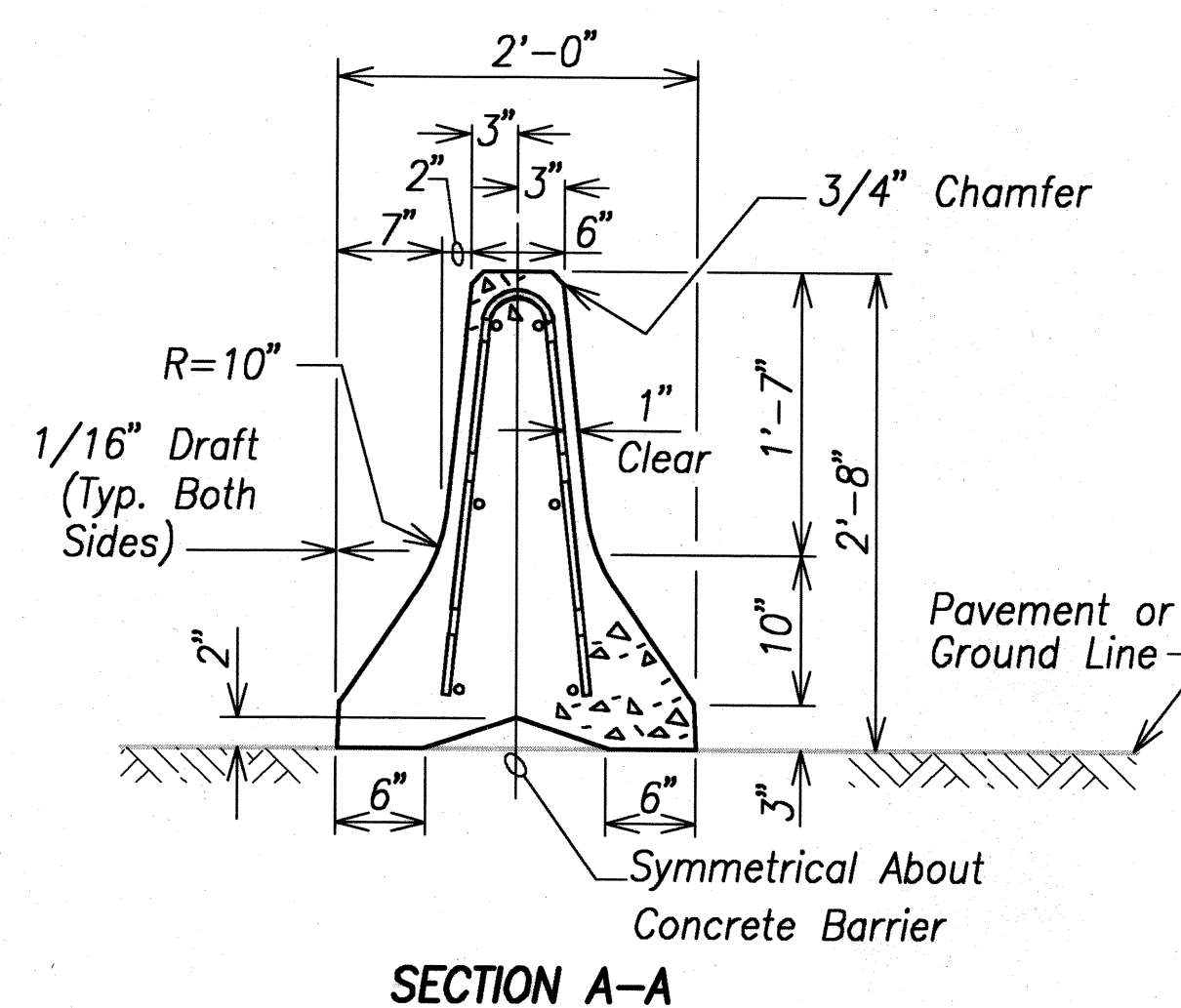
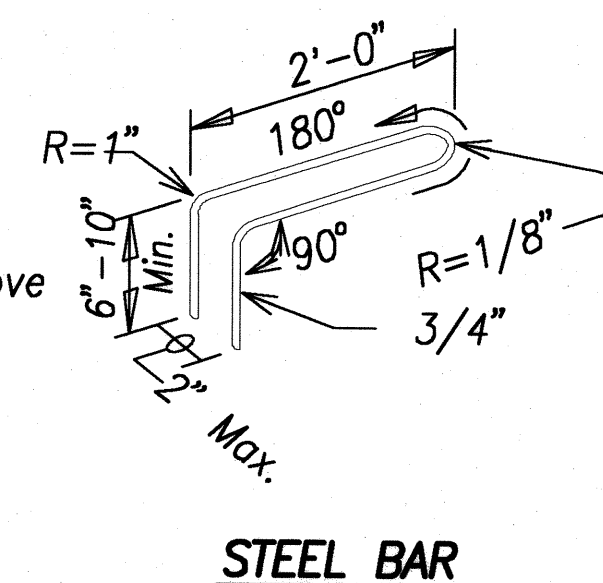
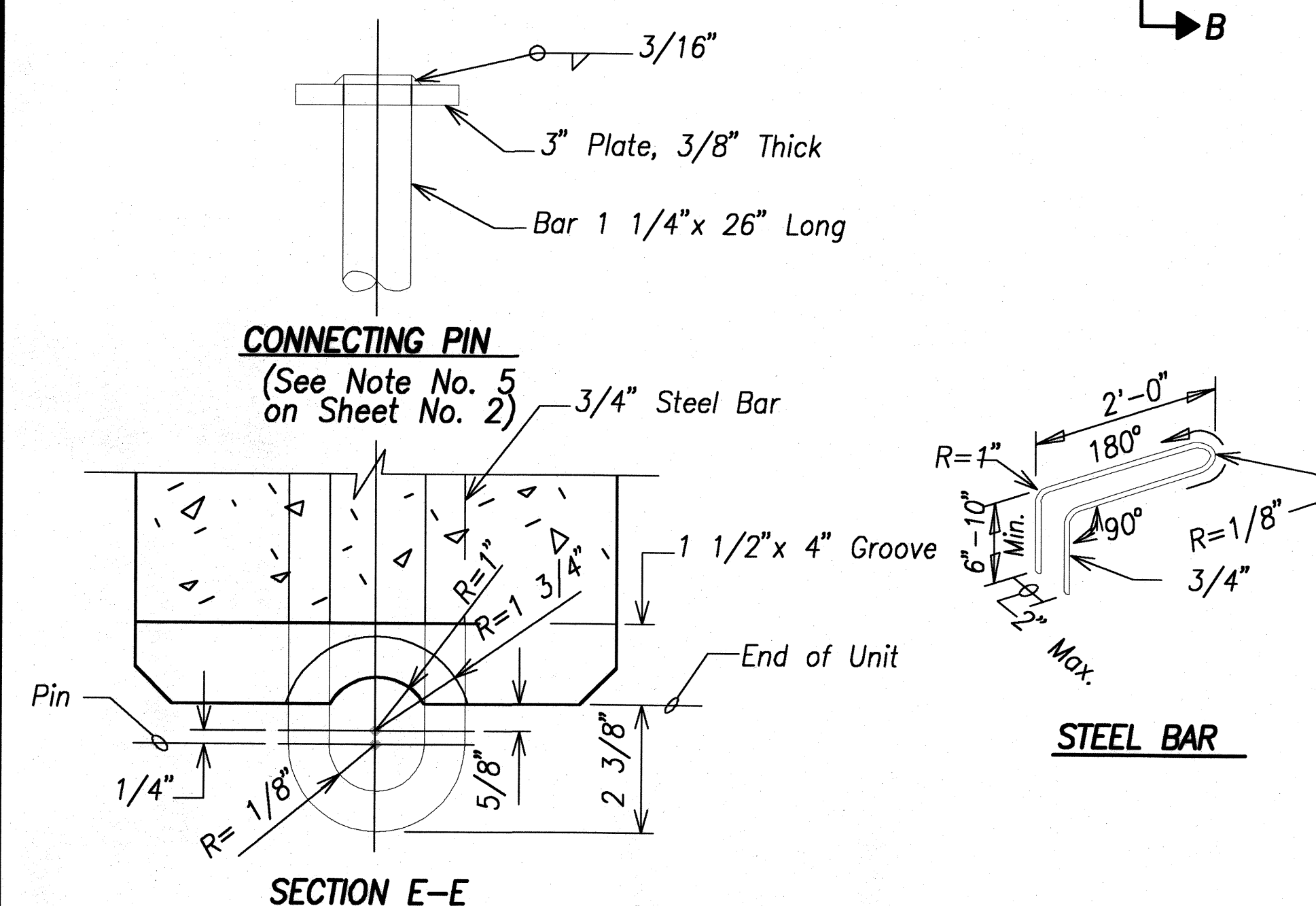
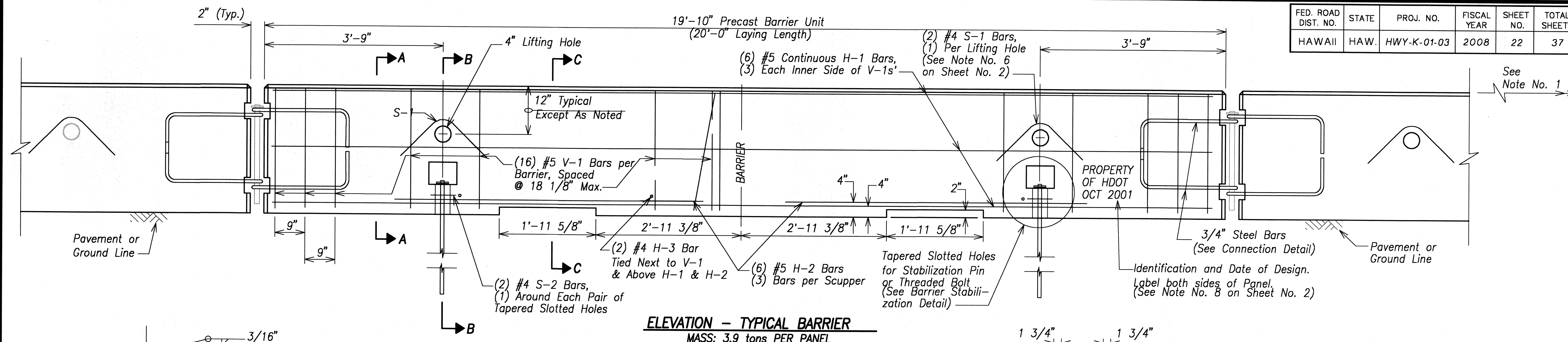


SURVEY PLOTTED BY	DATE
DRAWN BY	REV
NOTED BY	VC
CHECKED BY	No.

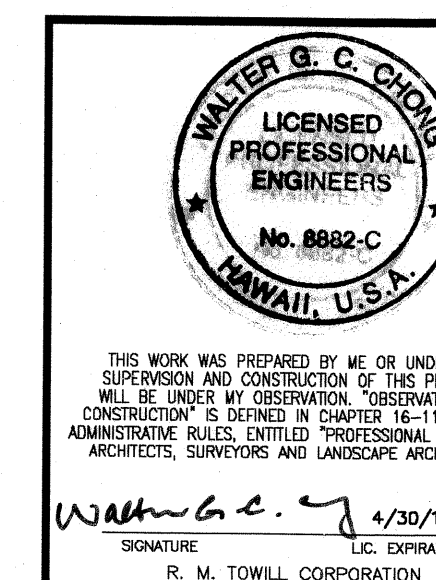
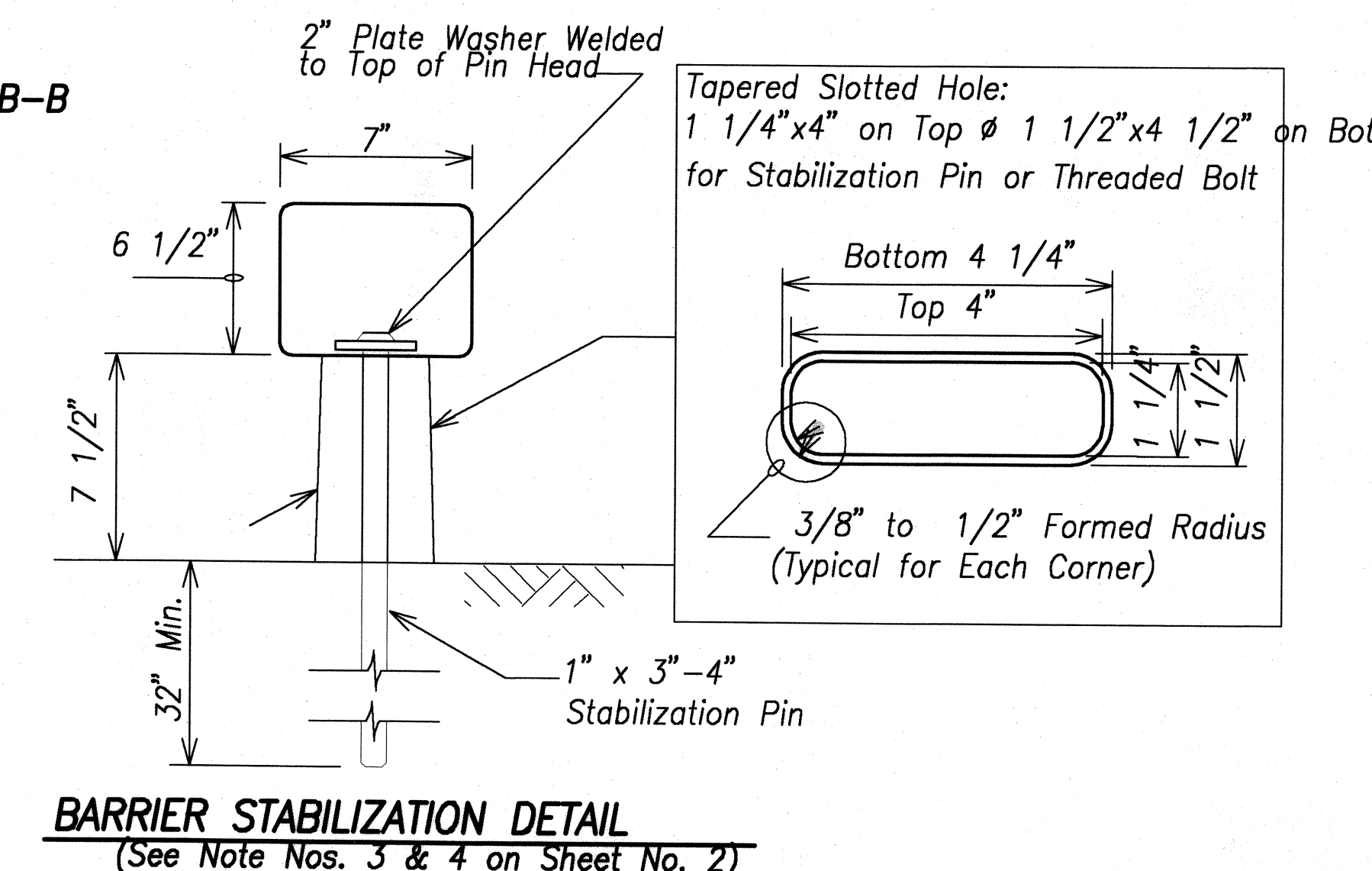
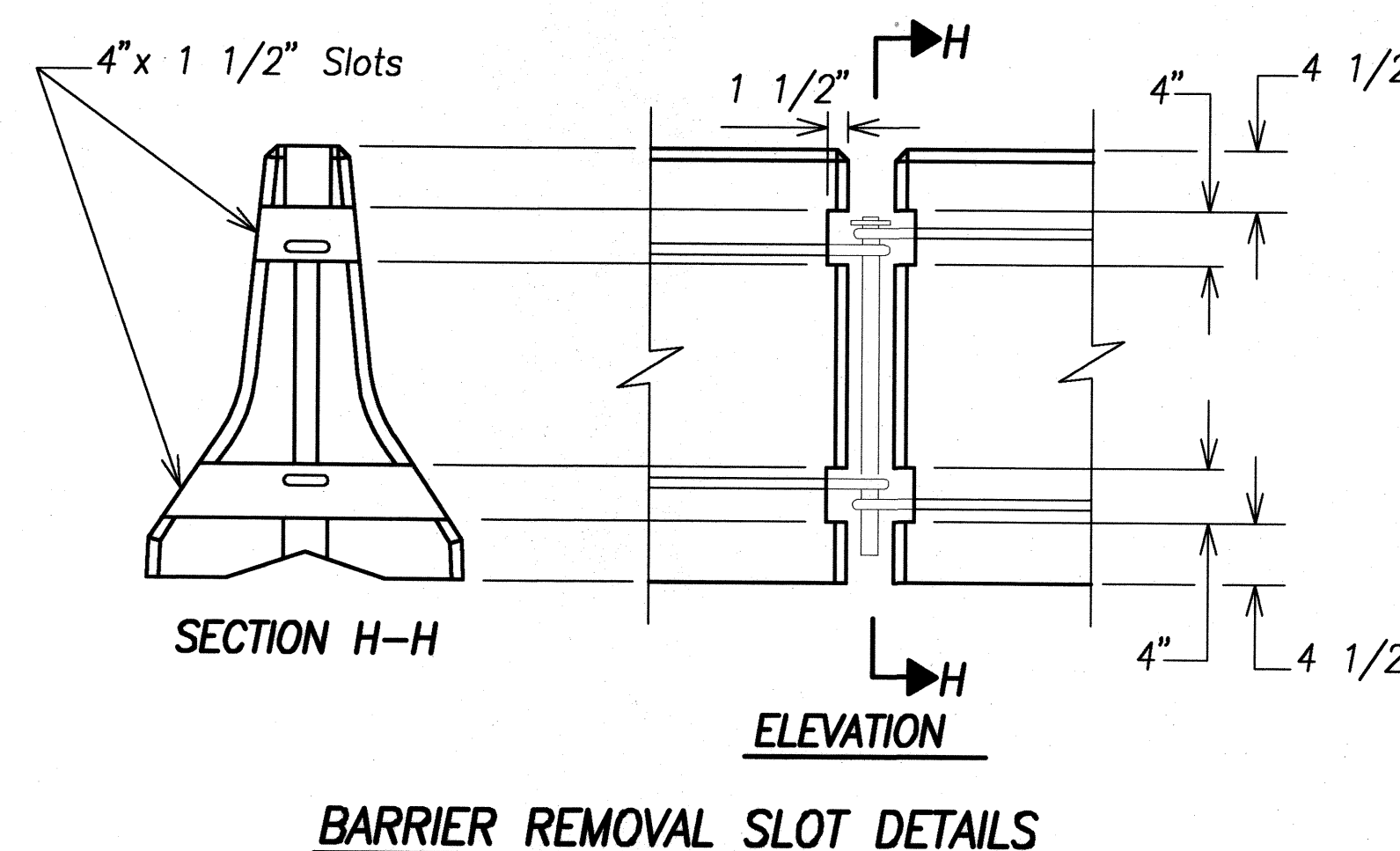
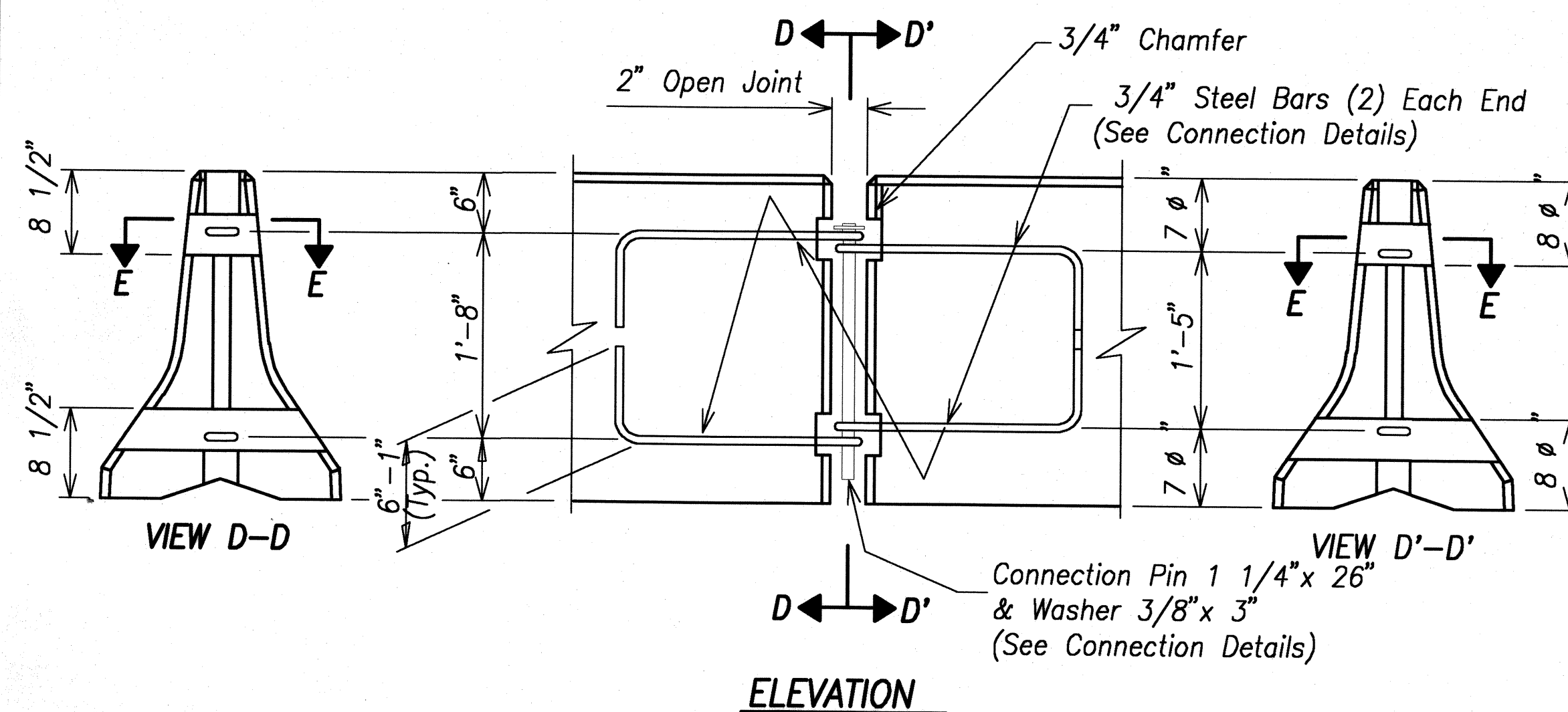
RMTC JOB NO. : 1-20132-0E



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	22	37



**CONNECTION DETAILS**  
(See Note No. 5 on Sheet No. 2)



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**PORTABLE CONCRETE BARRIER**

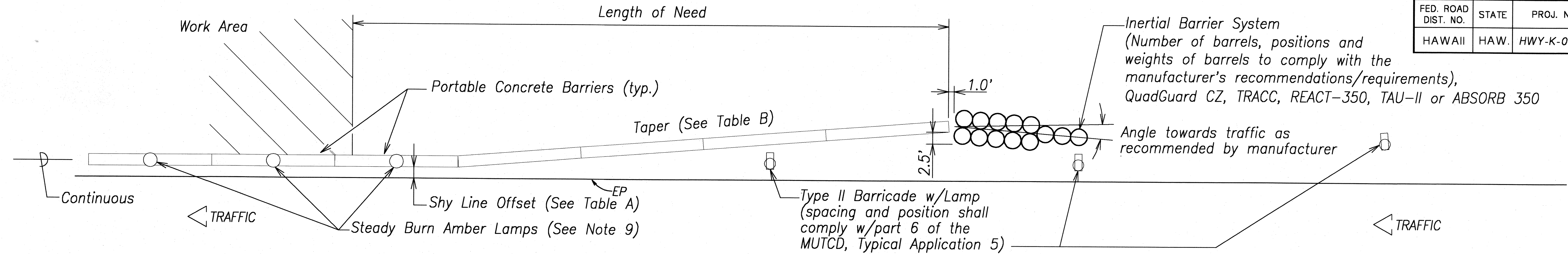
Kaunualii Highway, Kuhio Highway  
& Kuamoo Road Retaining Walls  
Project No. HWY-K-01-03

Scale: AS NOTED Date: MAY 2008

SHEET No. C-13 OF 19 SHEETS



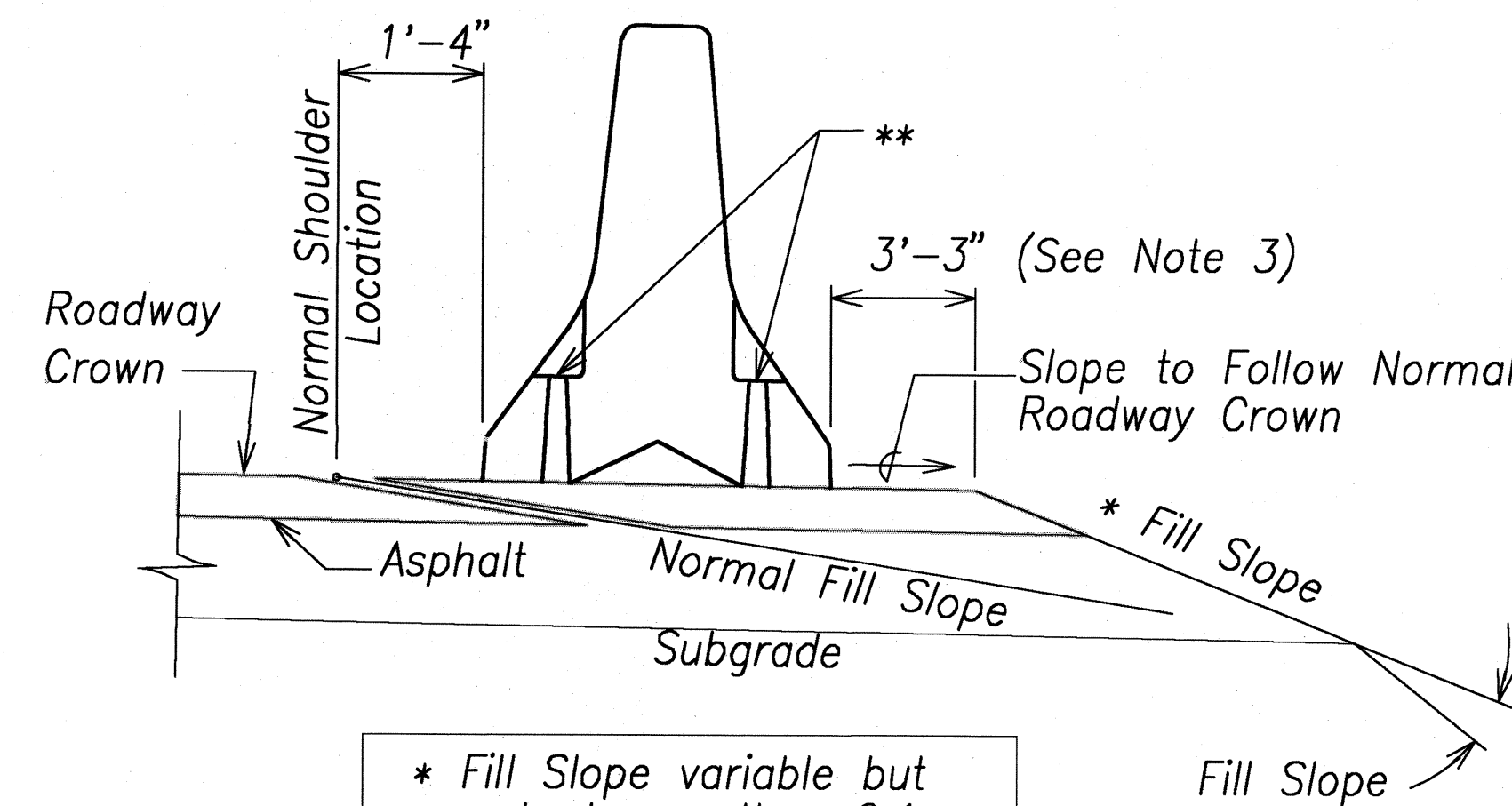
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	23	37



### TYPICAL DETAIL - PORTABLE CONCRETE BARRIER END TREATMENT

Scale: 1" = 10'-0"

METAL REINFORCEMENT TABLE				
MARK	LOCATION	BAR SIZE	(NO. BARS)	SKETCH
H-1	Horizontal in Barrier Tied Inside V-1 Bars	#5	(6)	19'-3"
H-2	Centered Above Scuppers Long. & Transversely	#5	(6)	6'-6"
H-3	Tied Above H-1 Bars to Support H-2, Tied to V-1	#4	(2)	1'-6"
S-1	Horizontal in Top of Wing Wall & in Floor Back Wall	#4	(2)	
S-2	Horizontal Around Slots Between V-1's @ Scuppers	#4	(2)	
V-1	Vertical in Barrier (3) Each End & (2) at Each Scupper	#5	(16)	



#### STANDARD INSTALLATION

(See Note No. 1)

TABLE A SHY LINE OFFSETS *	
DESIGN SPEED (mph)	SHY LINE OFFSETS
70	10.0'
65	9.0'
60	8.5'
55	7.0'
50	6.5'
45	6.0'
40	5.0'
35	4.5'
30	3.5'
≤ 25	2.0'

TABLE B MAXIMUM TAPERS FOR CONCRETE BARRIER		
DESIGN SPEED (mph)	TAPER	
	INSIDE SHY LINE	BEYOND SHY LINE
70	30:1	20:1
65	28:1	19:1
60	26:1	18:1
55	24:1	16:1
50	21:1	14:1
45	18:1	12:1
40	17:1	11:1
35	15:1	9:1
≤ 30	13:1	8:1

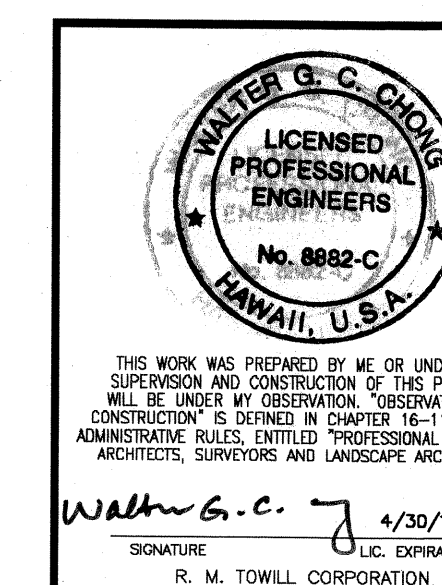
\* Note: Minimum shy line offset for tangent sections shall be 2'-0".

#### NOTES:

- For end treatment, layout, crash cushions and where needed see Project Plans or Special Provisions.
- Barriers must be pinned together and cannot exceed the Table of Maximum Tapers.
- The concrete barrier "Standard Installation" design allows for 3'-3" of outward lateral movement if the barrier is struck. Barrier installations that require less than the 3'-3" of outward lateral movement should have stabilization pins.
- ASTM A-36 steel shall be used for the connection pin, connection loops and stabilization pins. A one piece pin with a 3" rounded top may be used in place of the detailed connection pin if the one piece pin meets ASTM A-36 requirements.
- A 4" white PVC sleeve may be used to form the lifting hole and if used the sleeve is to be left in place.
- Concrete shall be Class A and reinforcing shall be Grade 60.
- Identification and date of design will be as follows:  
PROPERTY OF HDOT  
OCT 2001  
Text letters and numbers shall be shown as on Standard Plan Sht. No. B-01.
- Minimum tangent length for portable Concrete Barrier System shall be 100' (5 units). This minimum does not include the required system length of the Inertial Barrier System.
- Install steady burn amber lamps on portable concrete barriers @ 20.0' o.c. Installing, maintaining and removing each steady burn amber lamp including changing of batteries and bulbs shall be considered incidental to applicable portable concrete barrier items.

DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
IN CHARGE	_____
NO.	_____

PORTABLE CONCRETE BARRIER  
NOT TO SCALE



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**PORTABLE CONCRETE  
BARRIER**

Kaunualii Highway, Kuhio Highway  
& Kuamoo Road Retaining Walls  
Project No. HWY-K-01-03

Scale: AS NOTED

Date: MAY 2008

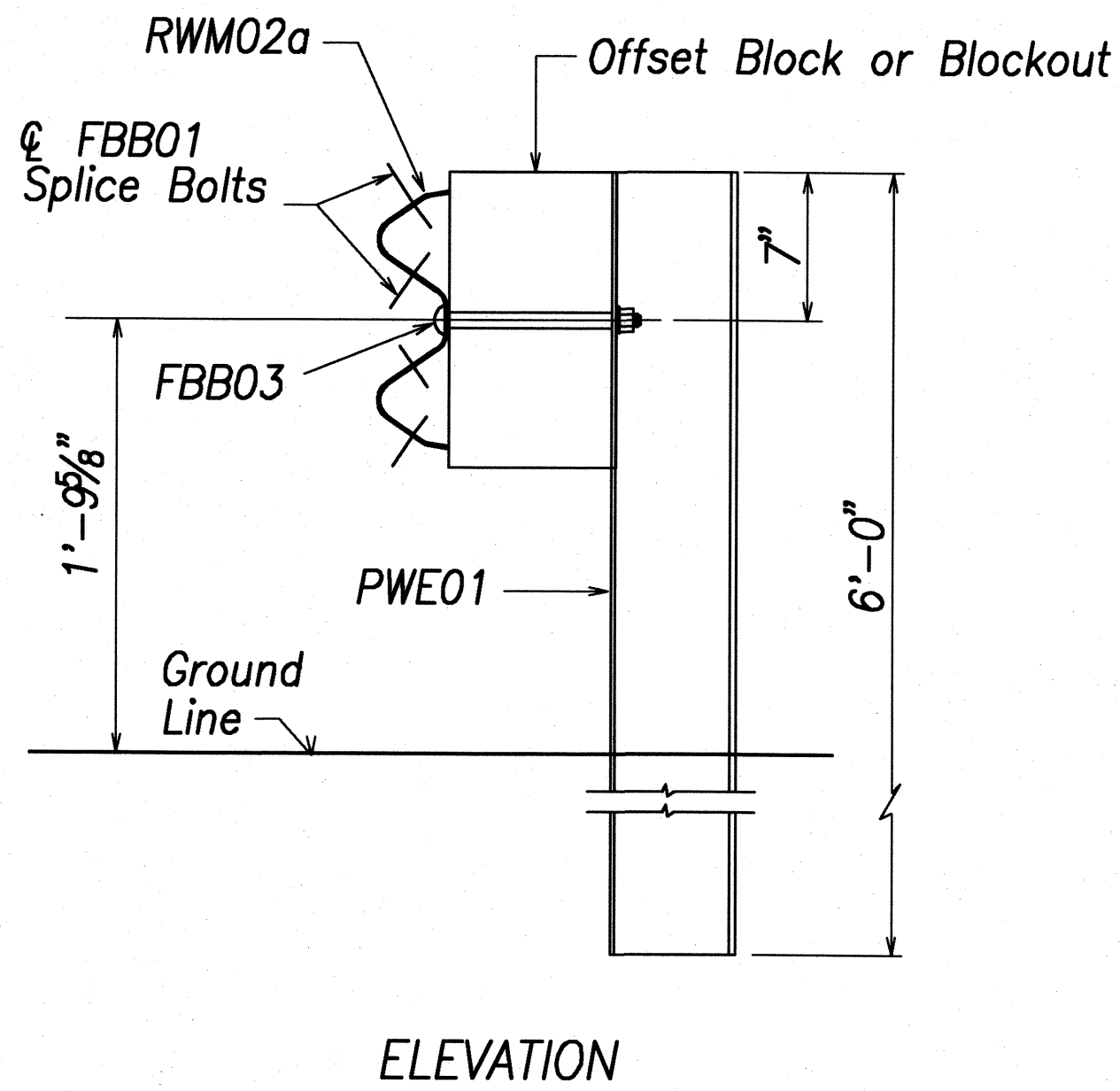
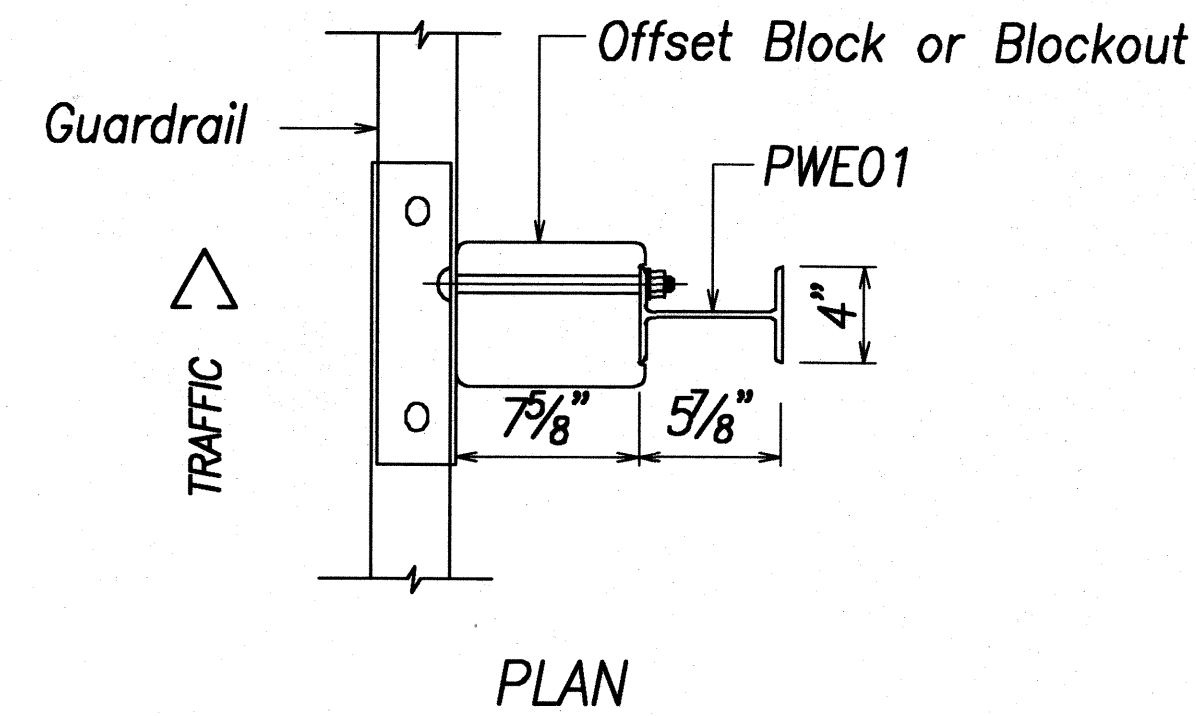
SHEET No. C-14 OF 19 SHEETS



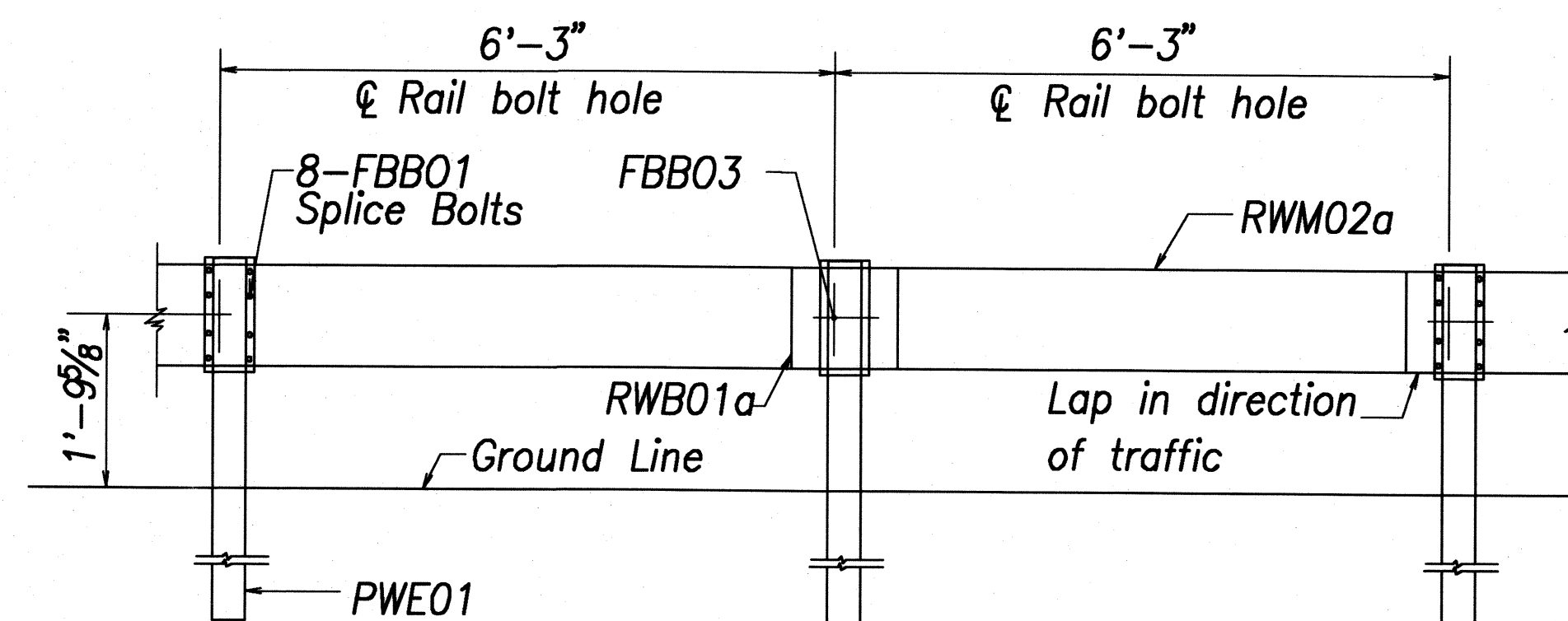




FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	25	37

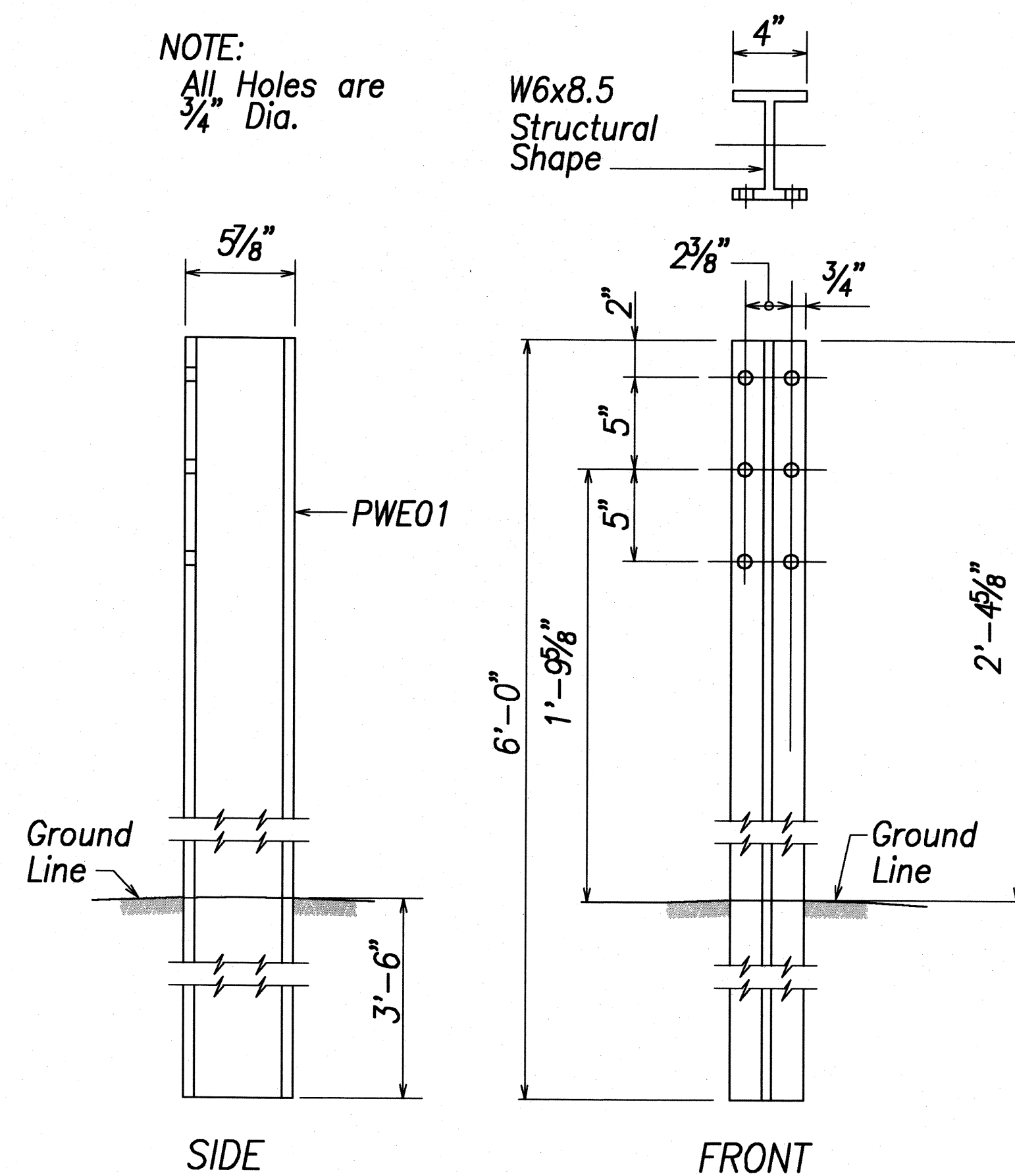


STRONG POST W-BEAM GUARDRAIL (SGR04a)

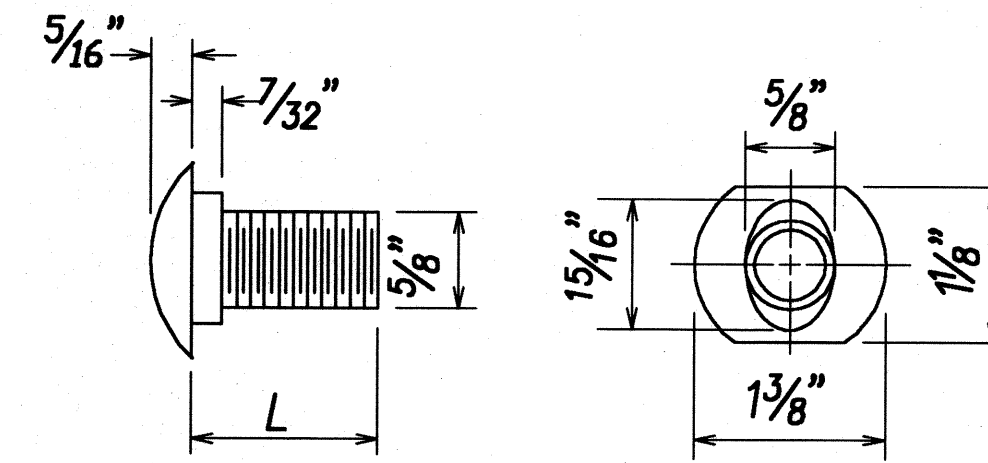


STRONG POST W-BEAM GUARDRAIL WITH RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT

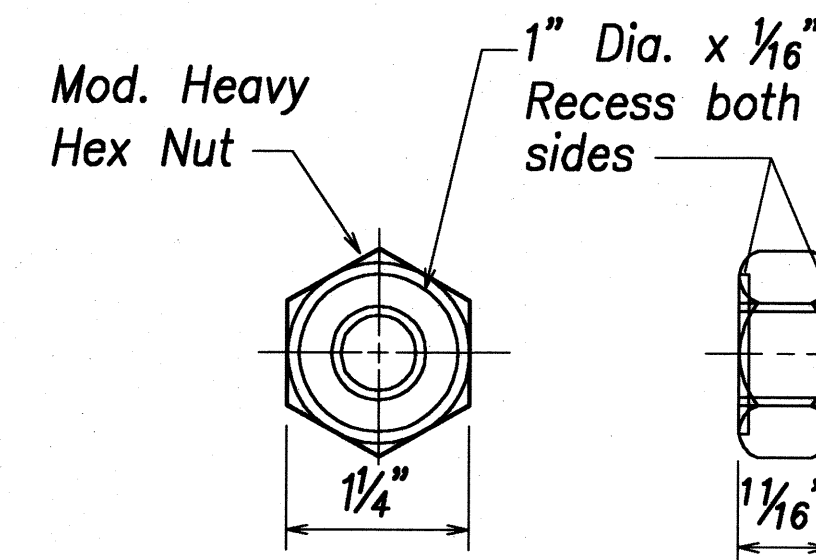
NOTE:  
All Holes are  
3/4" Dia.



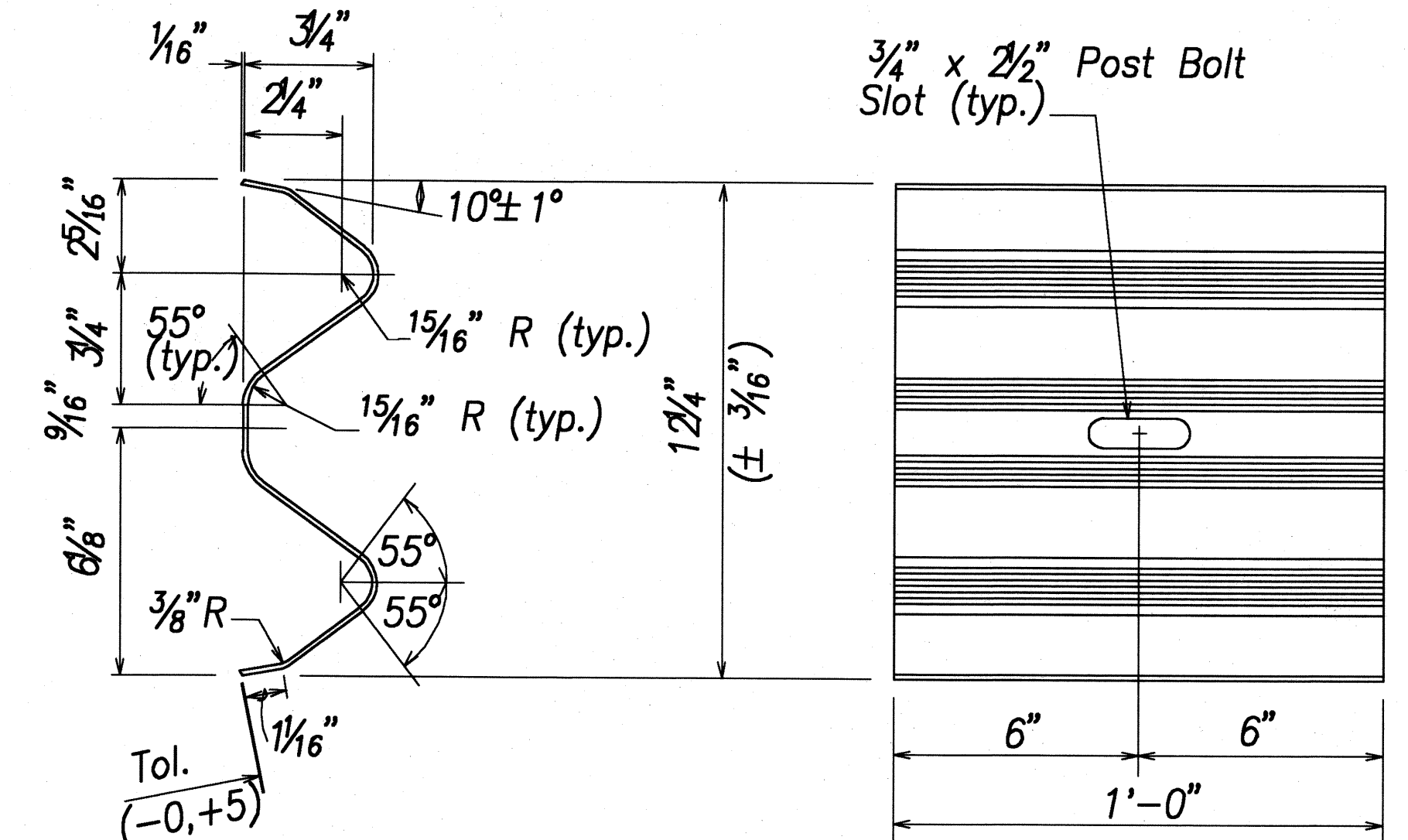
W-BEAM STRONG POST (PWE01)



DESIGNATOR	L
FBB01	1 3/8"
FBB02	2"
FBB03	10"

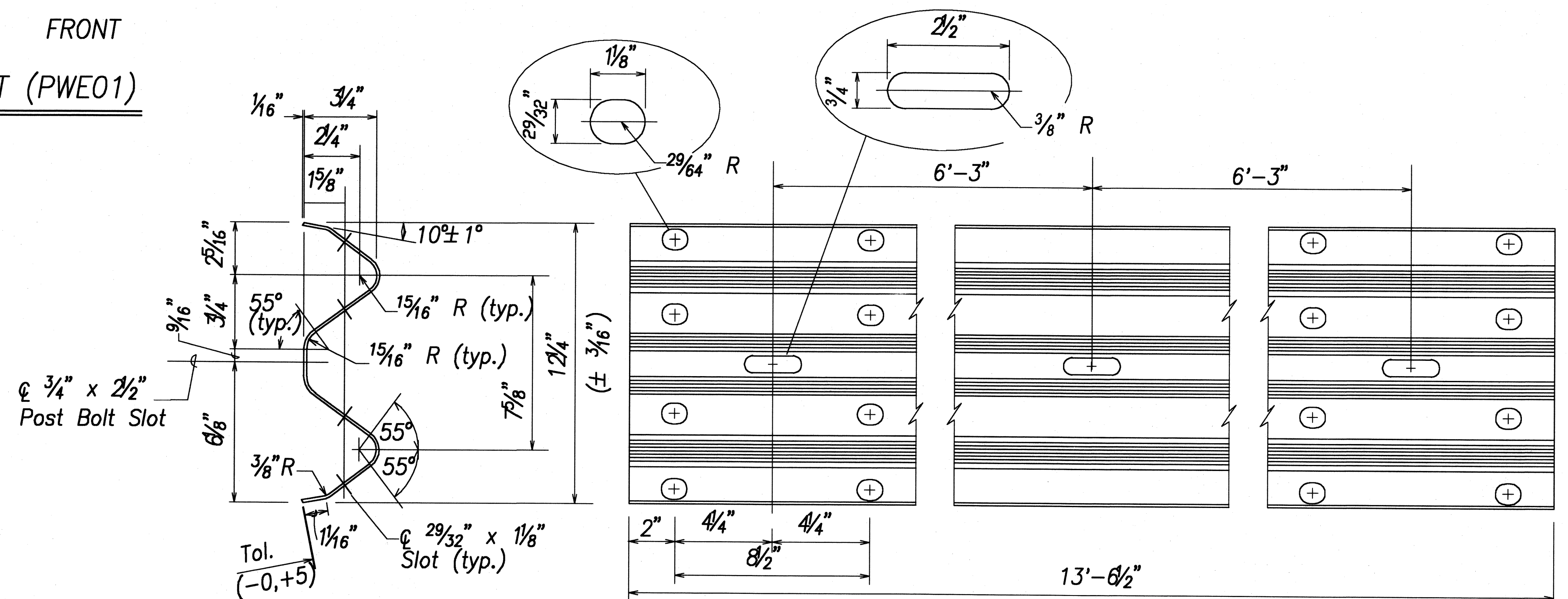


GUARDRAIL BOLTS AND RECESSED NUT



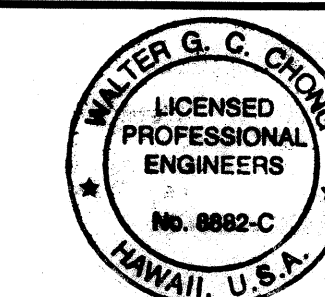
DESIGNATOR	BASE METAL THICKNESS
RWB01a	12 Gauge

W-BEAM BACK-UP-PLATE (RWB01a)



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 Gauge

2 SPACE W-BEAM GUARDRAIL (RWM02a)



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION OF CONSTRUCTION IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES, ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

Walter G. C. Chong  
SIGNATURE  
R. M. TOWILL CORPORATION

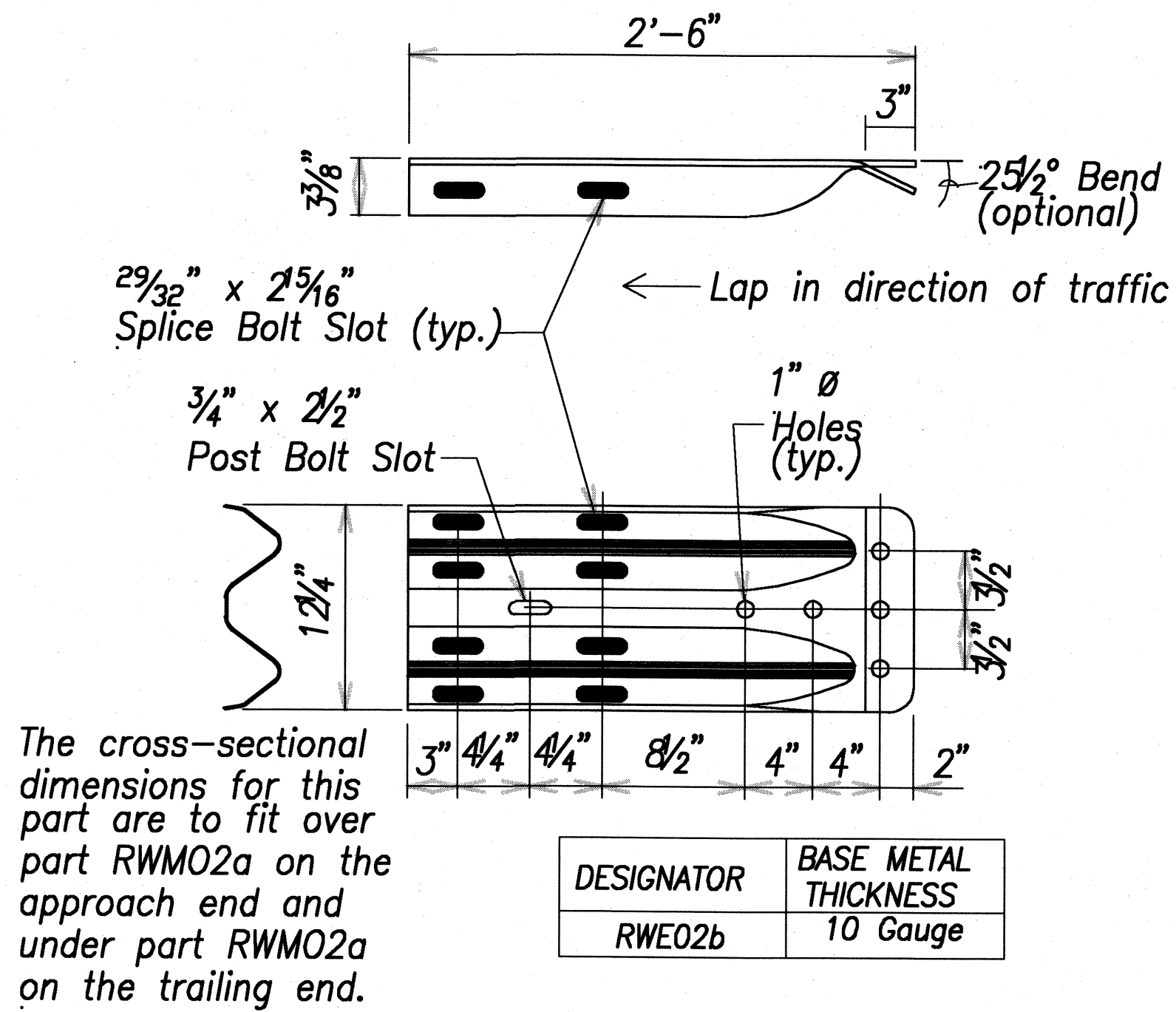
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STRONG POST  
W-BEAM GUARDRAIL**  
Kaunualii Highway, Kuhio Highway  
& Kuamoo Road Retaining Walls  
Project No. HWY-K-01-03

Scale: AS NOTED Date: MAY 2008

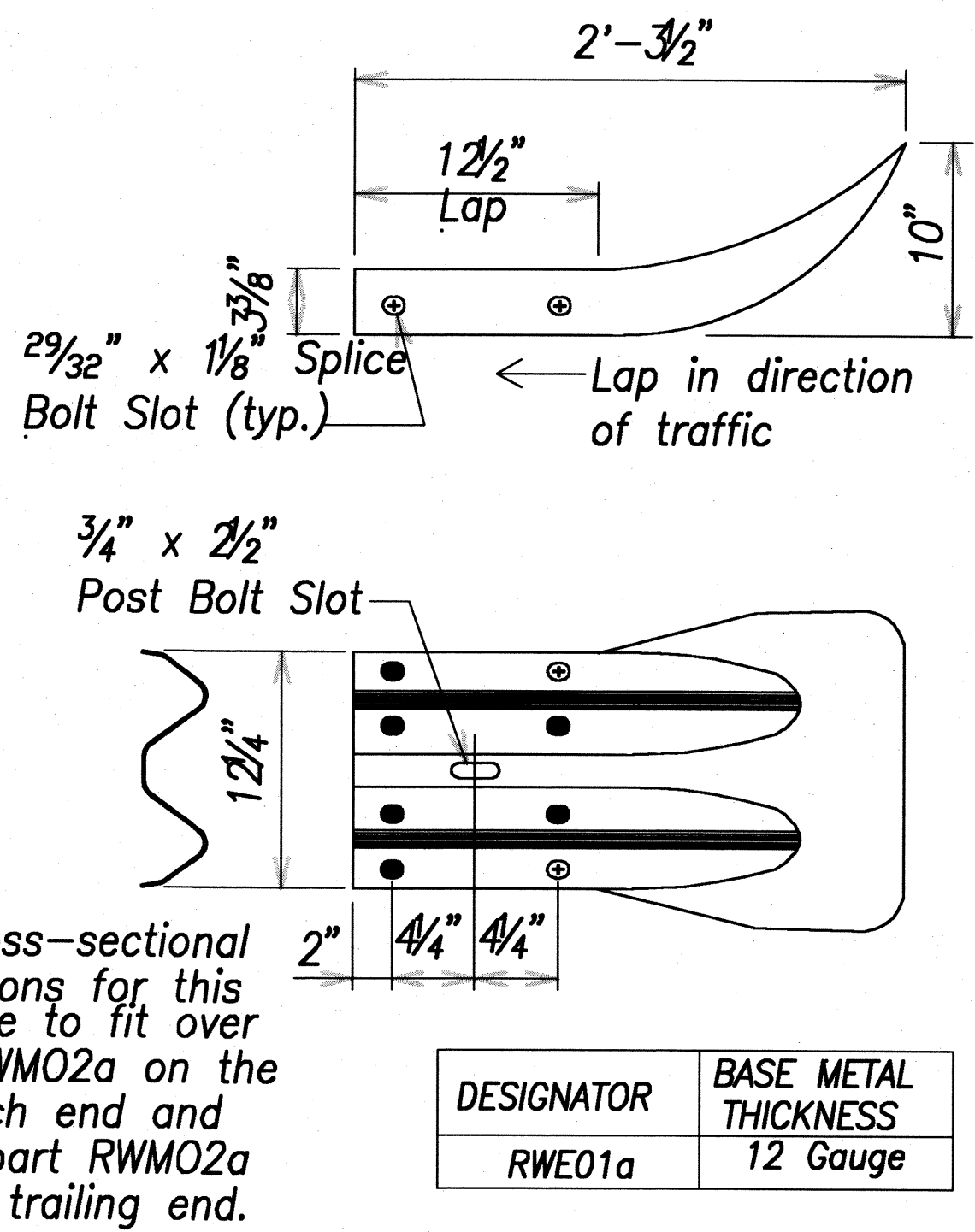
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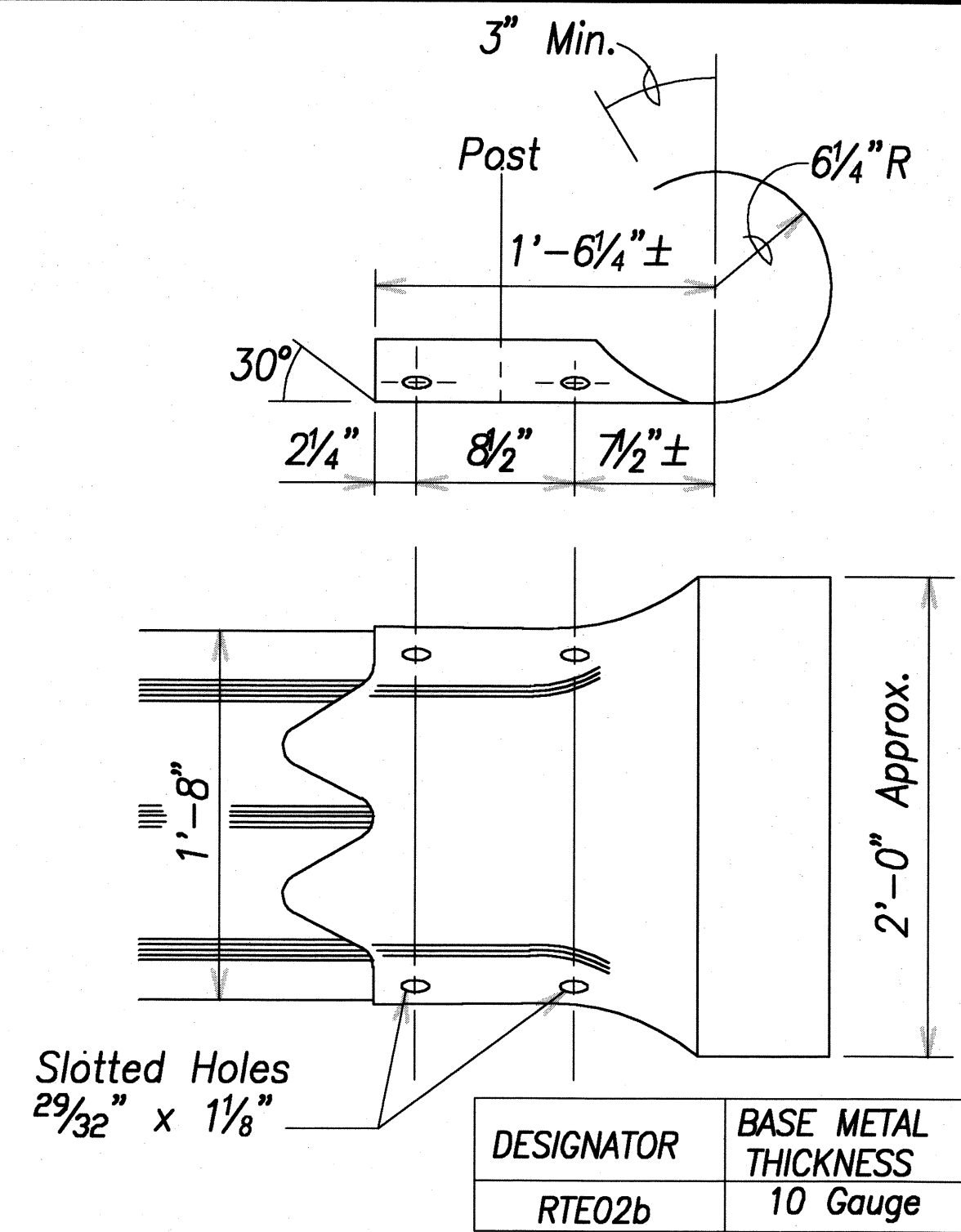
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HAWAII	HAW.	HWY-K-01-03	2008	26	37



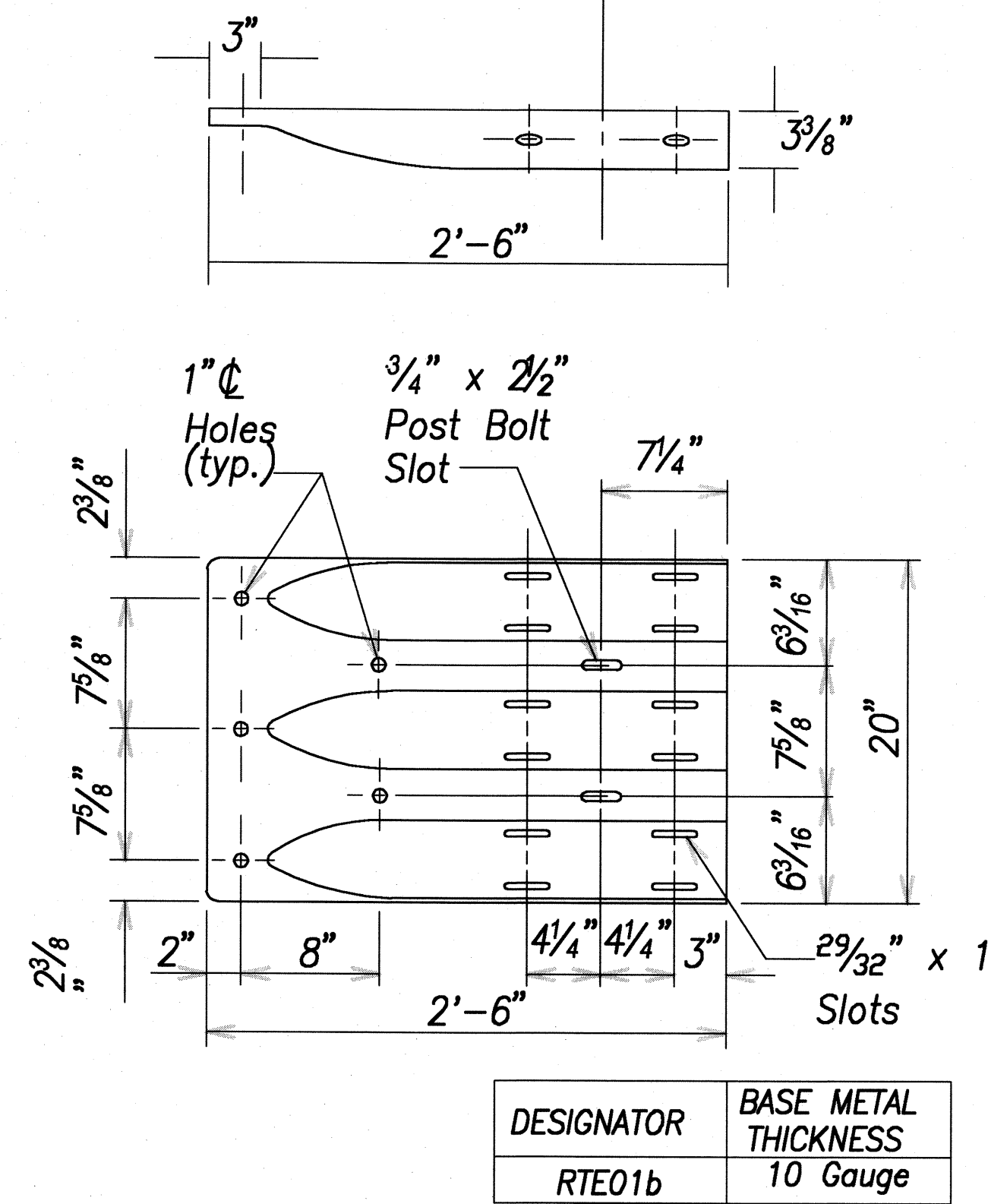
W-BEAM TERMINAL CONNECTOR (RWE02b)



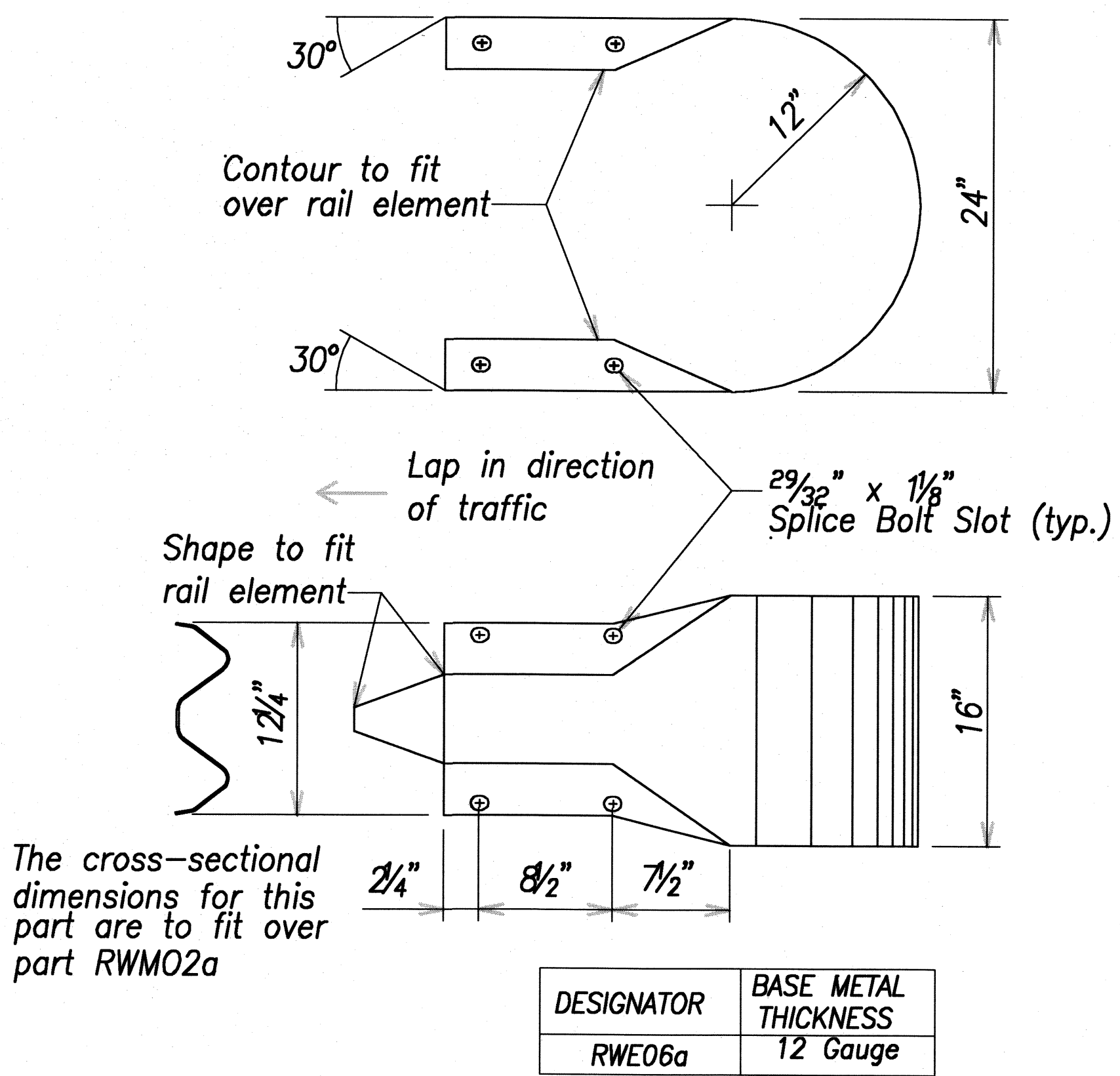
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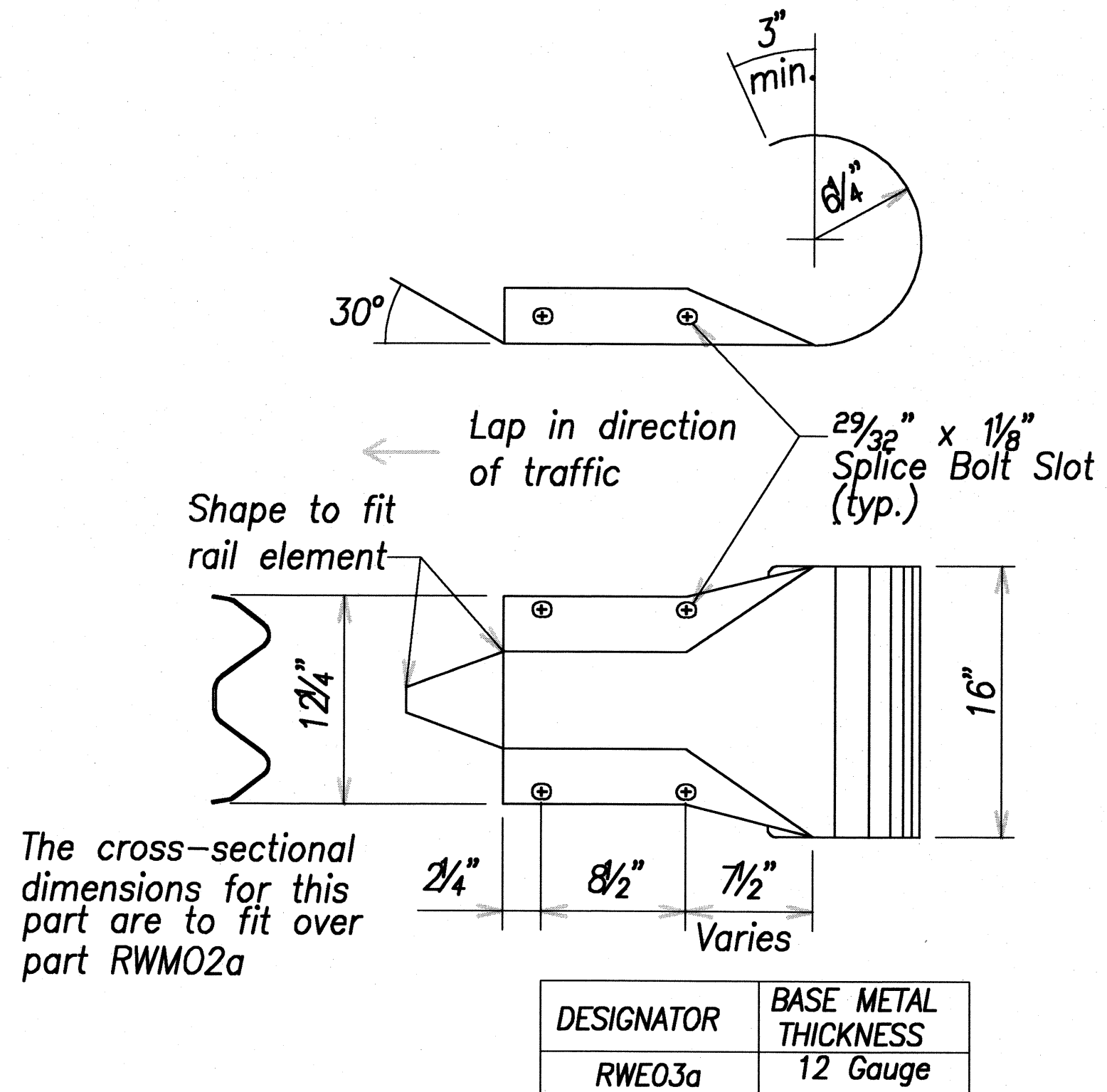
THRIE-BEAM SECTION (ROUNDED) (RTE02b)



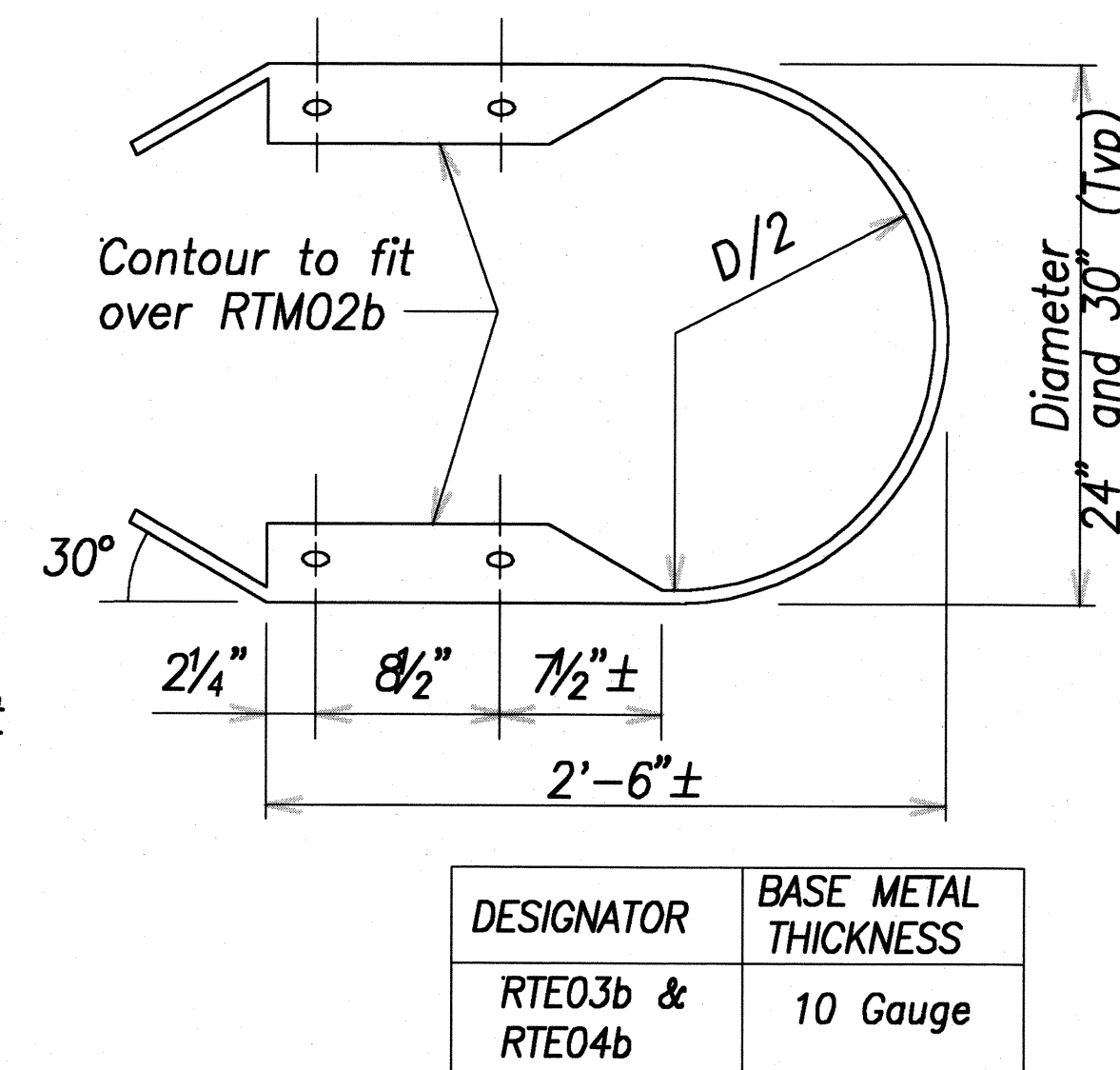
THRIE-BEAM TERMINAL CONNECTOR (RTE01b)



W-BEAM END SECTION (BUFFER RWE06a)

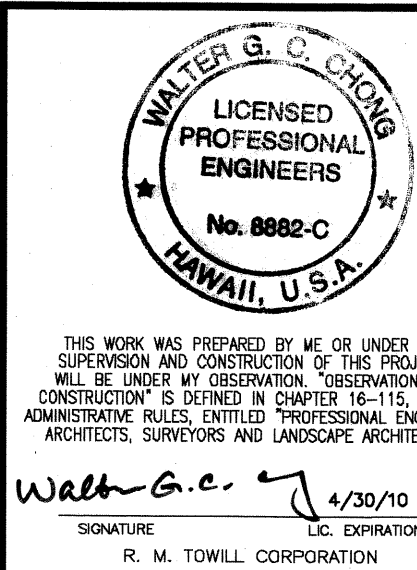


W-BEAM END SECTION (ROUNDED RWE03a)



THRIE-BEAM END SECTION (BUFFER RTE03b OR RTE04b)

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
DESIGNED BY	DRY	
NOTED BY	MC	
QUANTITIES BY		
CHECKED BY		
No.		



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**GUARDRAIL TERMINAL CONNECTORS AND END SECTIONS**

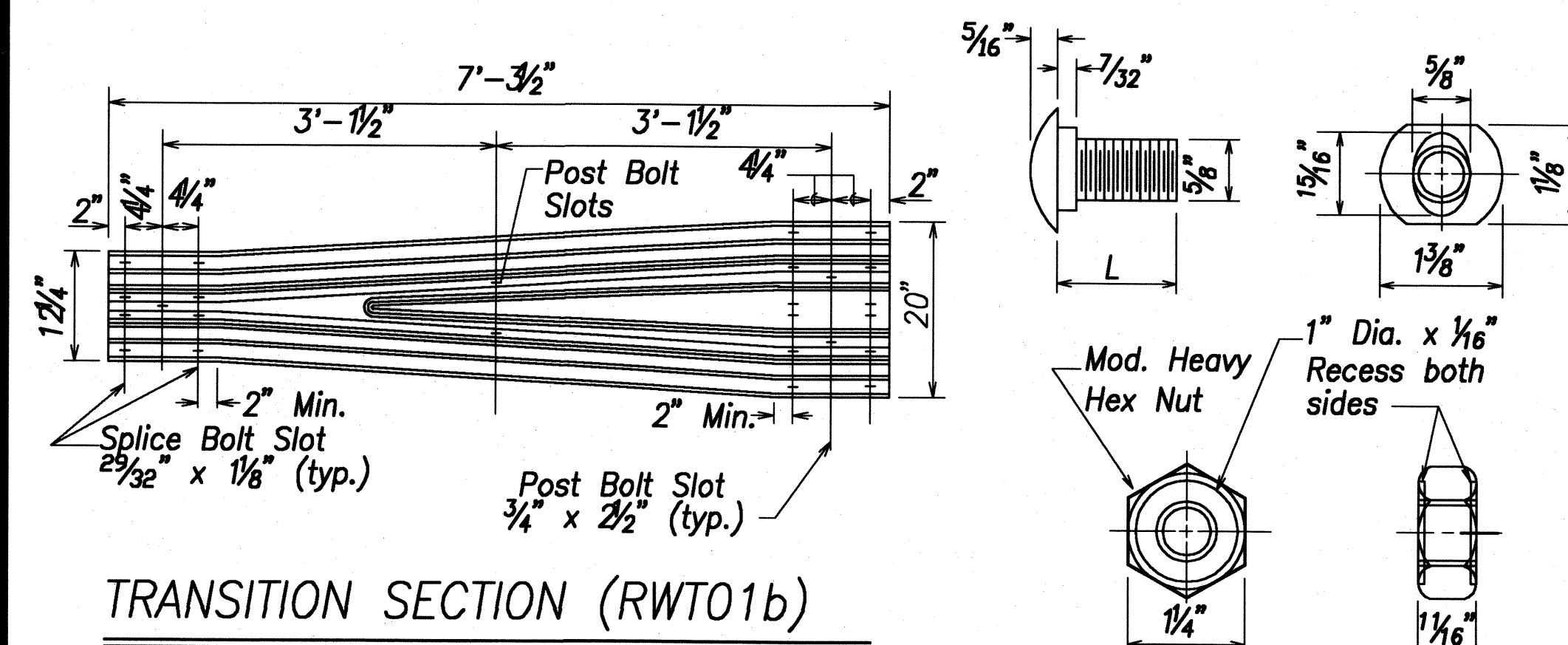
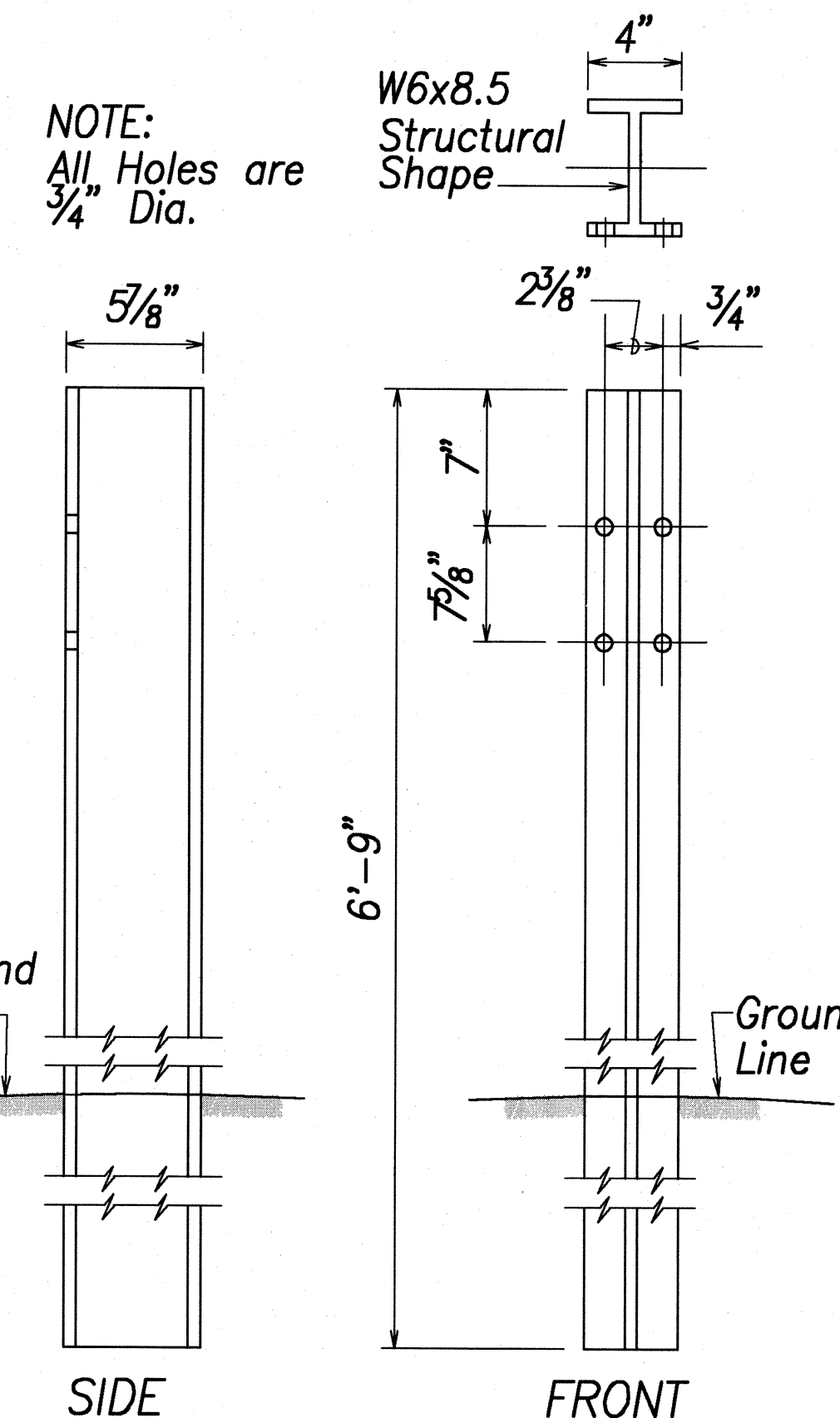
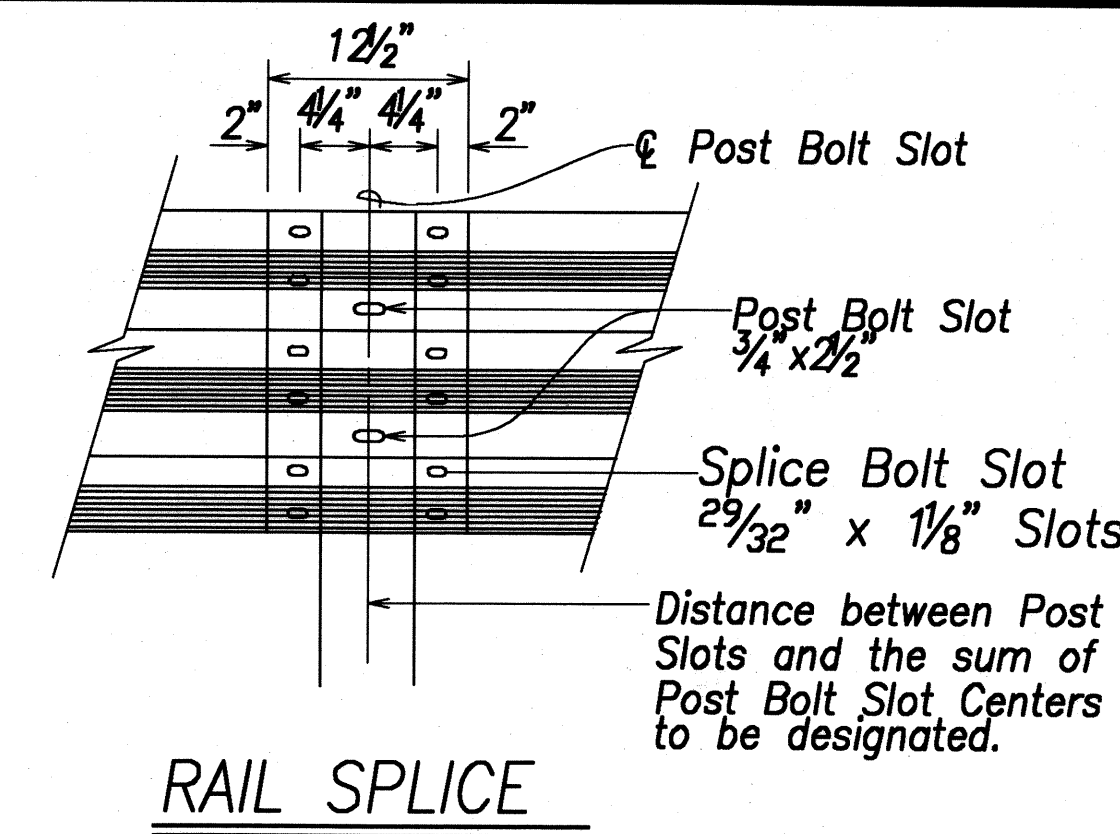
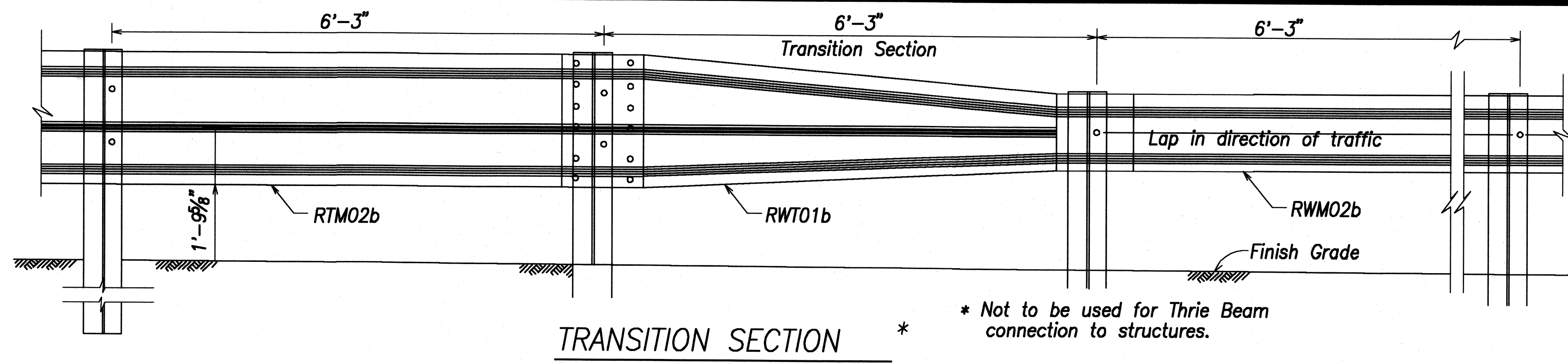
*Kaunualii Highway, Kuhio Highway & Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

Scale: AS NOTED Date: MAY 2008

SHEET No. C-17 OF 19 SHEETS

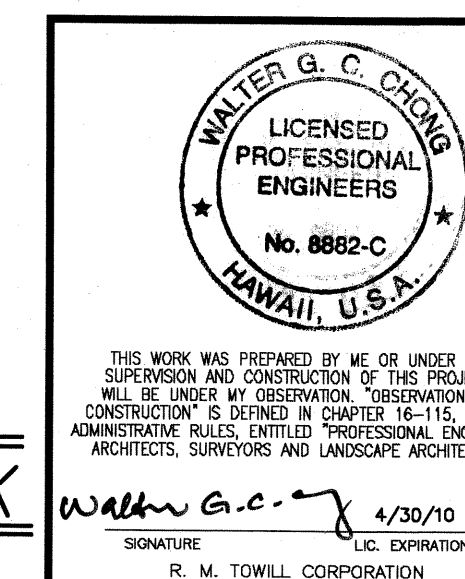
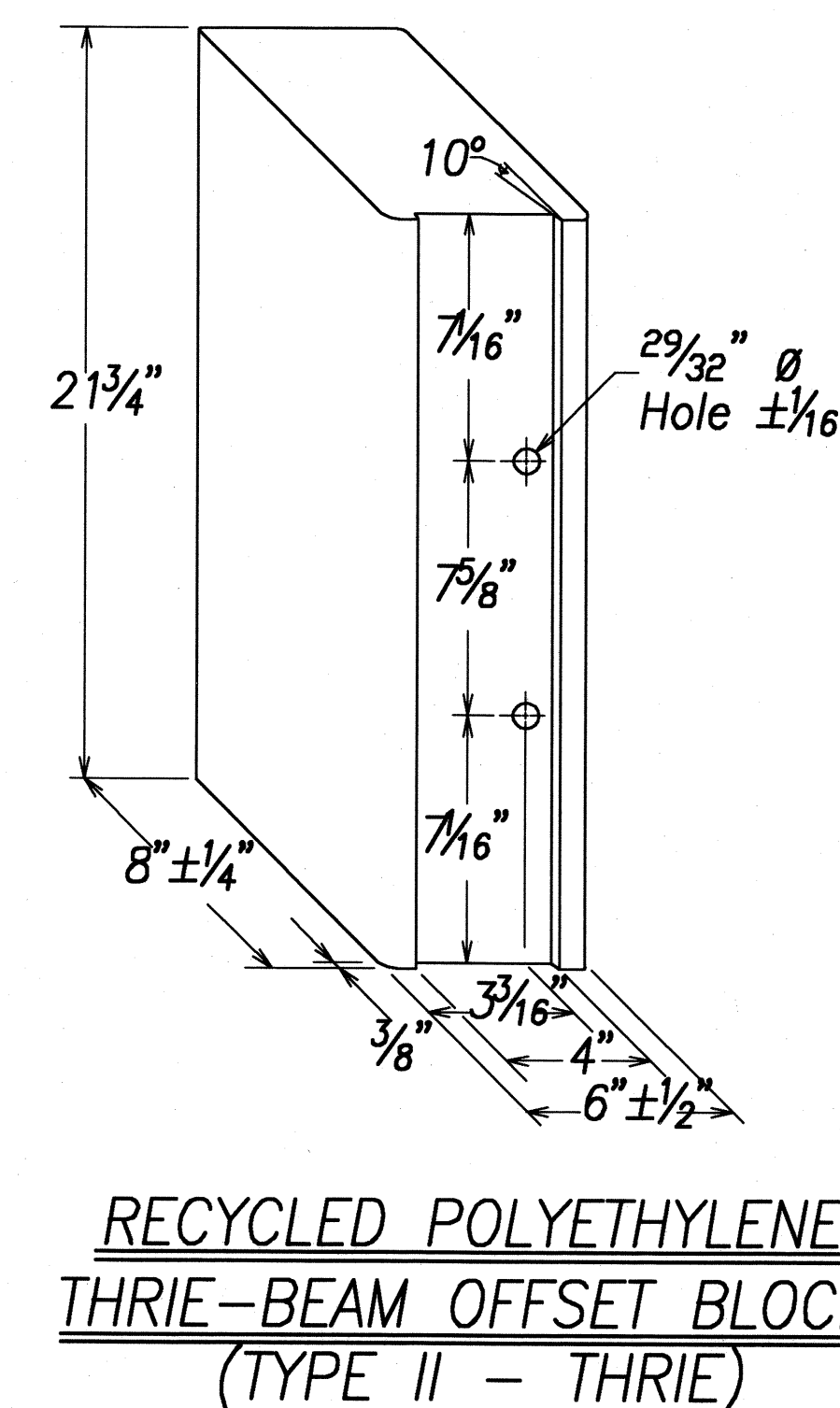
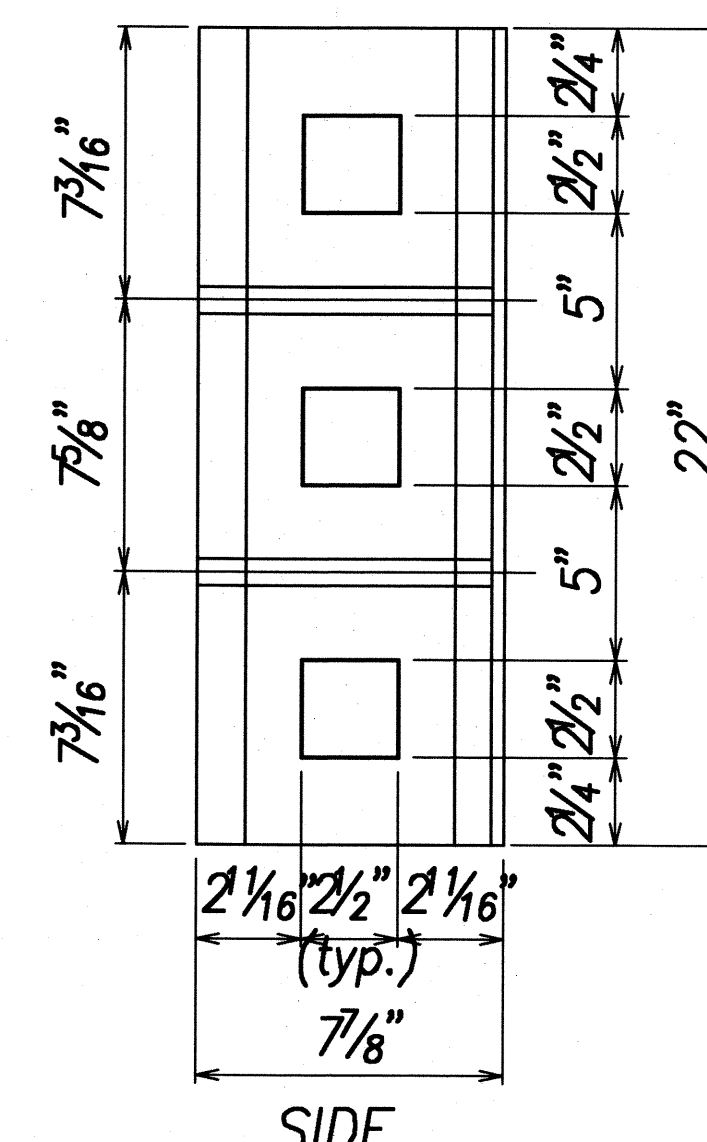
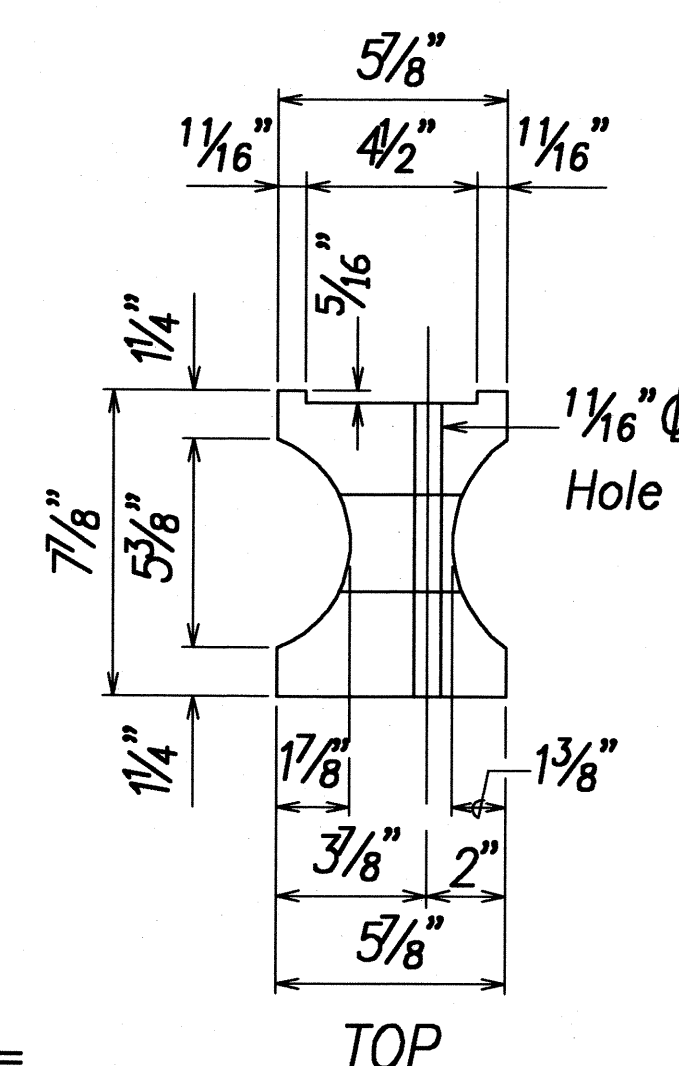
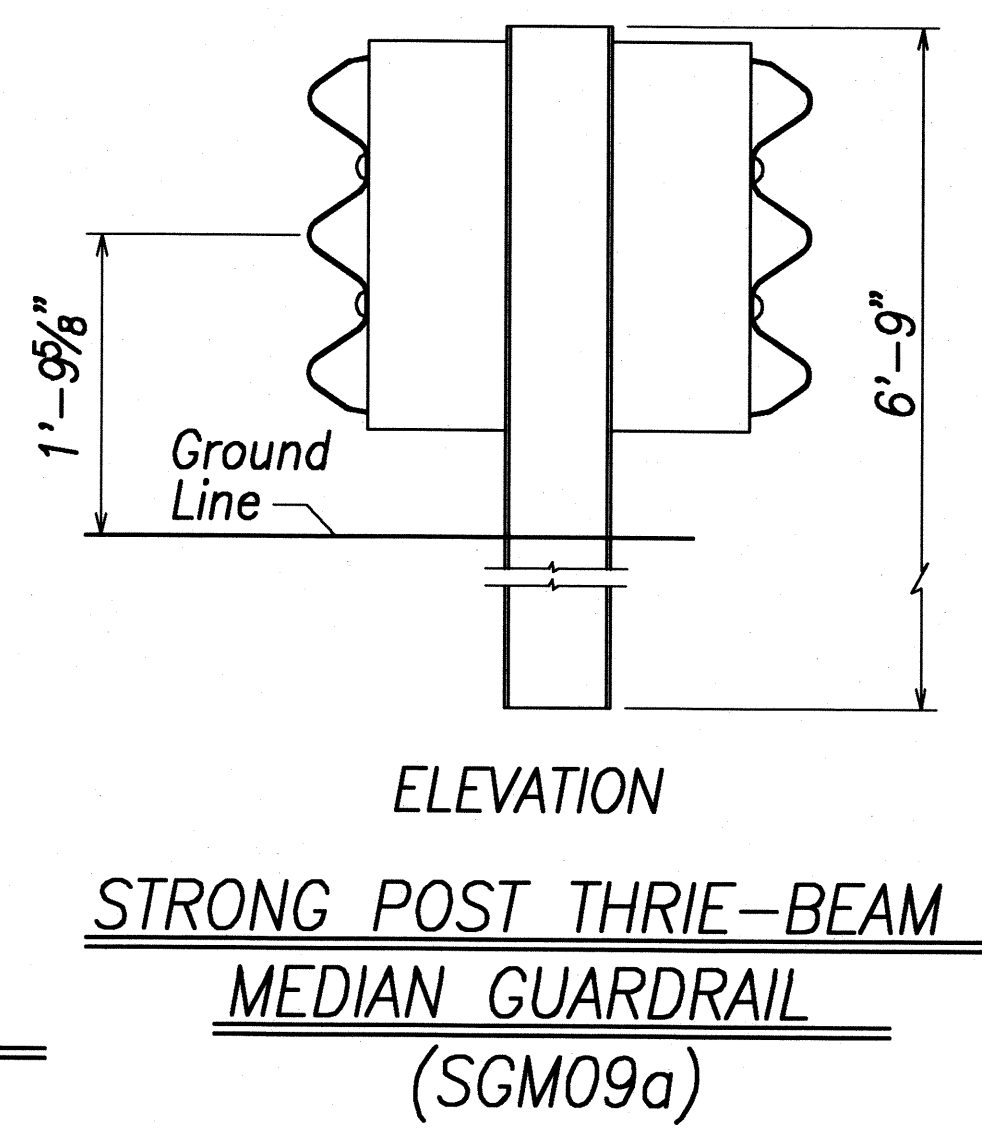
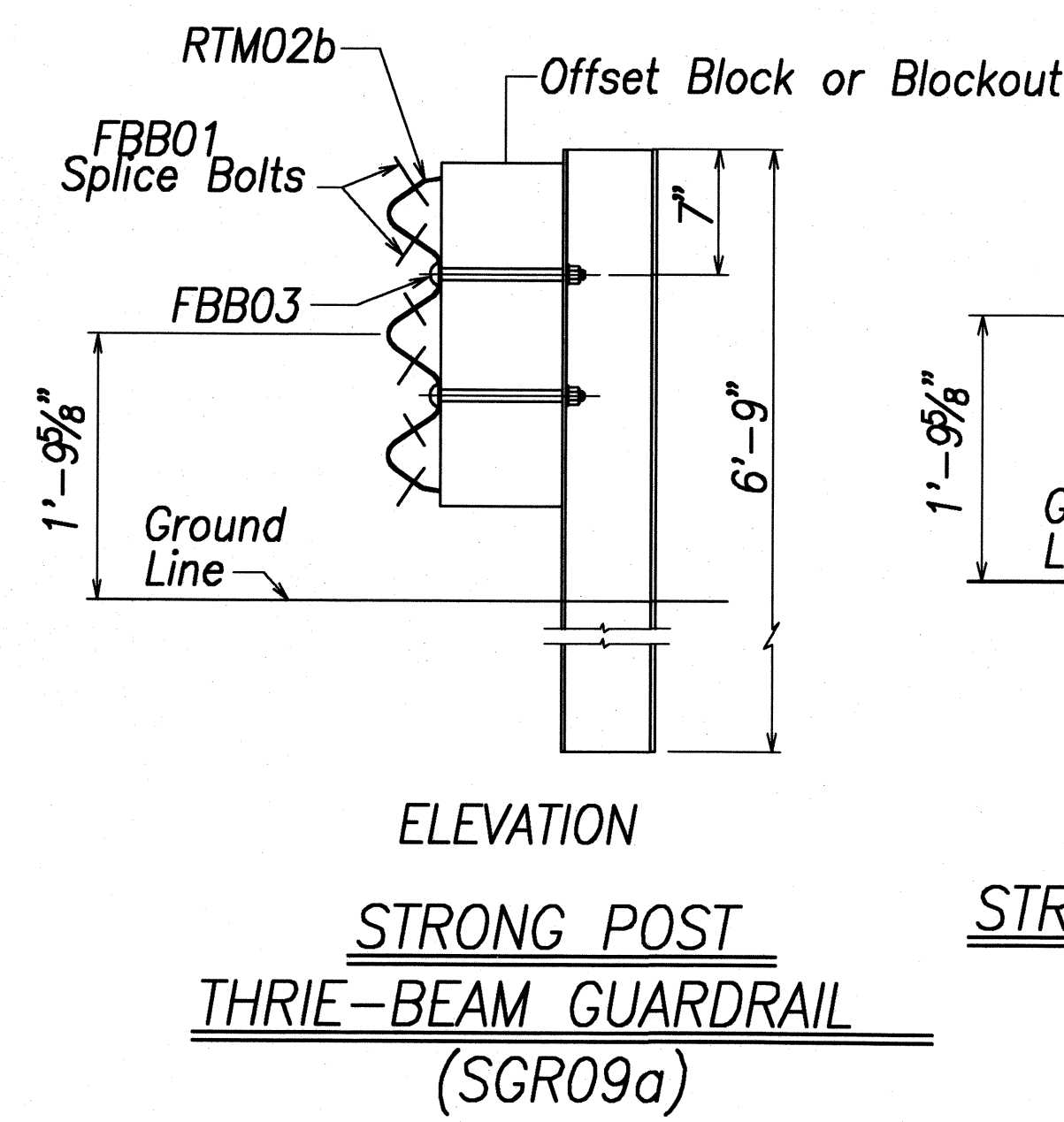
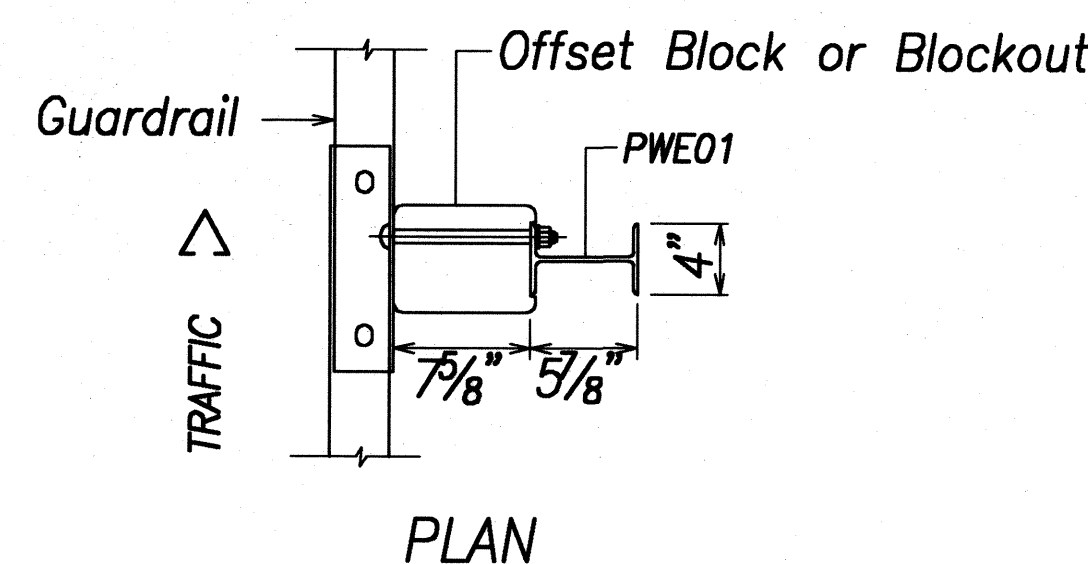
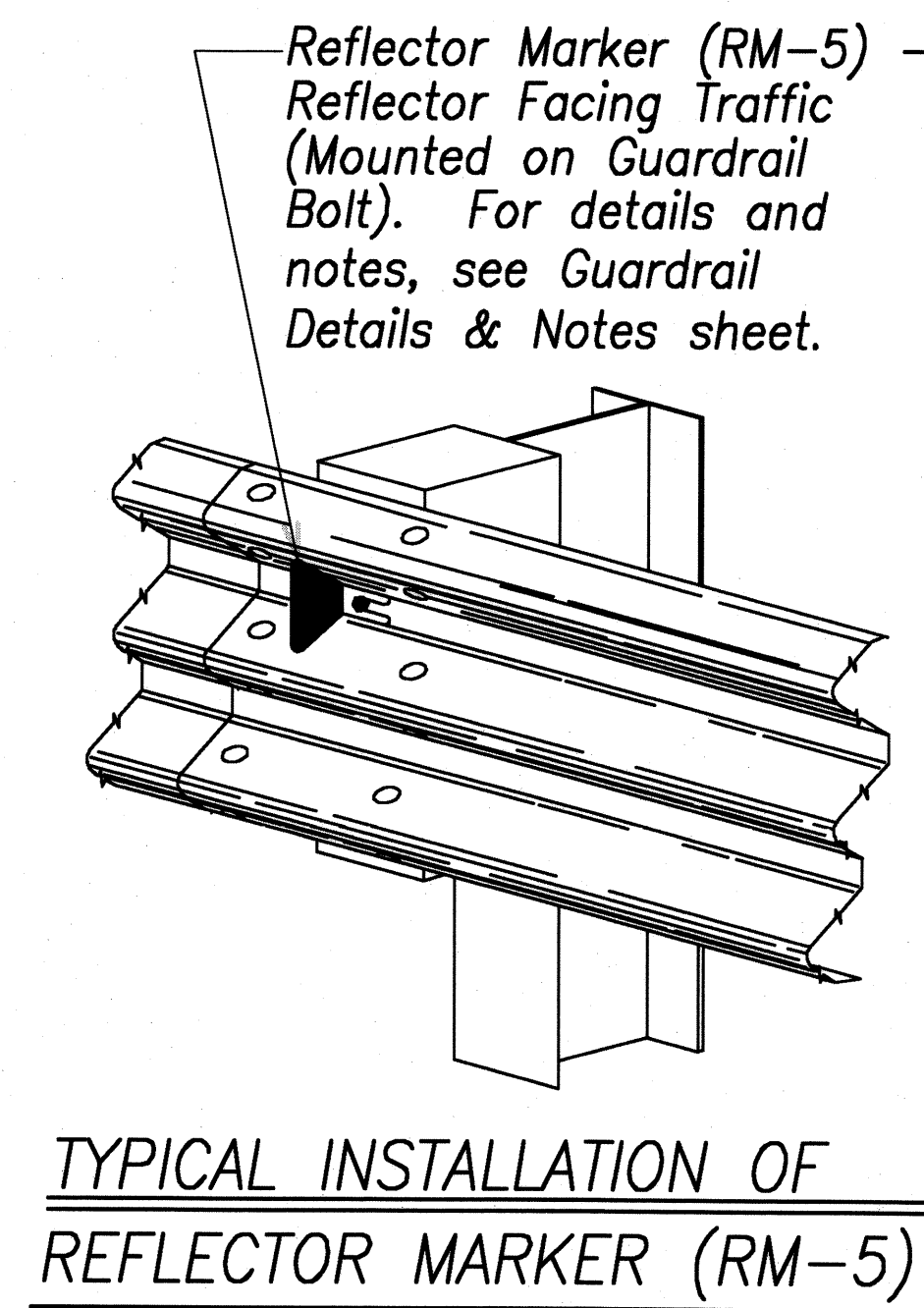
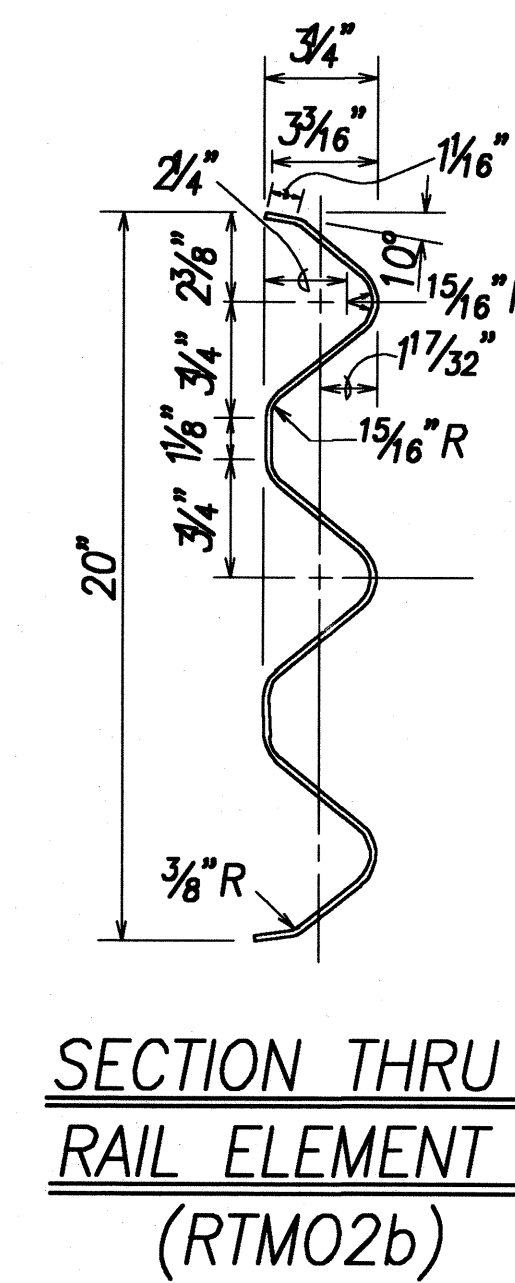
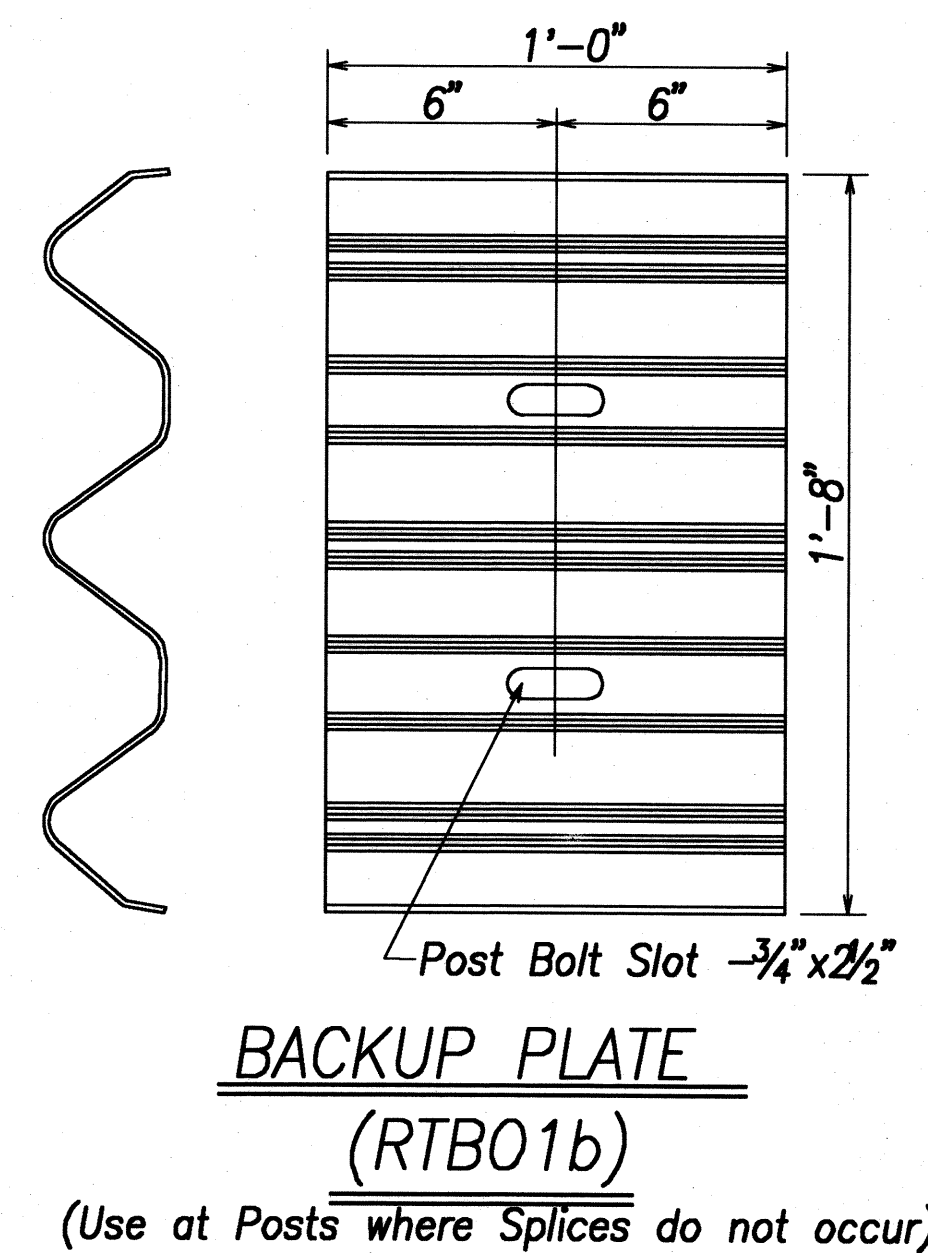


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	27	37



DESIGNATOR	L
FBB01	1 3/8"
FBB02	2"
FBB03	10"

**GUARDRAIL BOLTS AND RECESSED NUT**



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STRONG POST**  
**THRIE-BEAM GUARDRAIL**  
*Kaunualii Highway, Kuhio Highway  
& Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

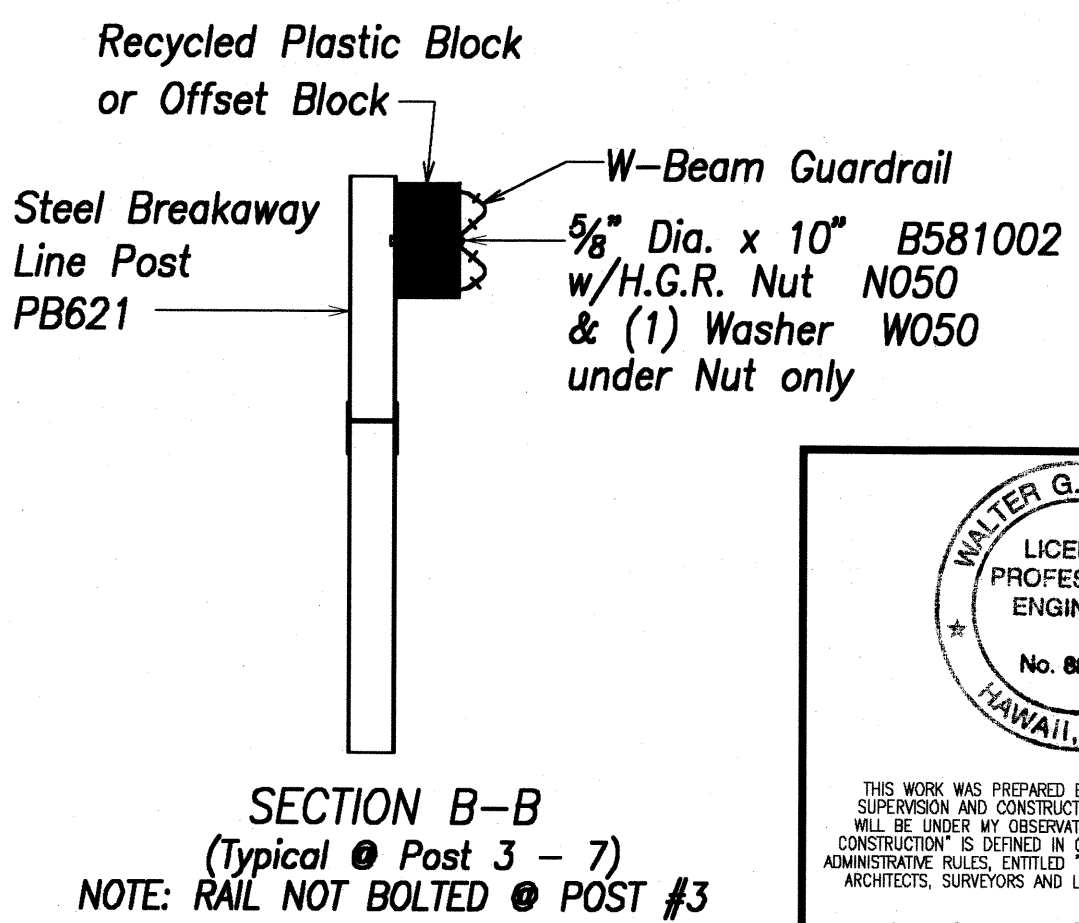
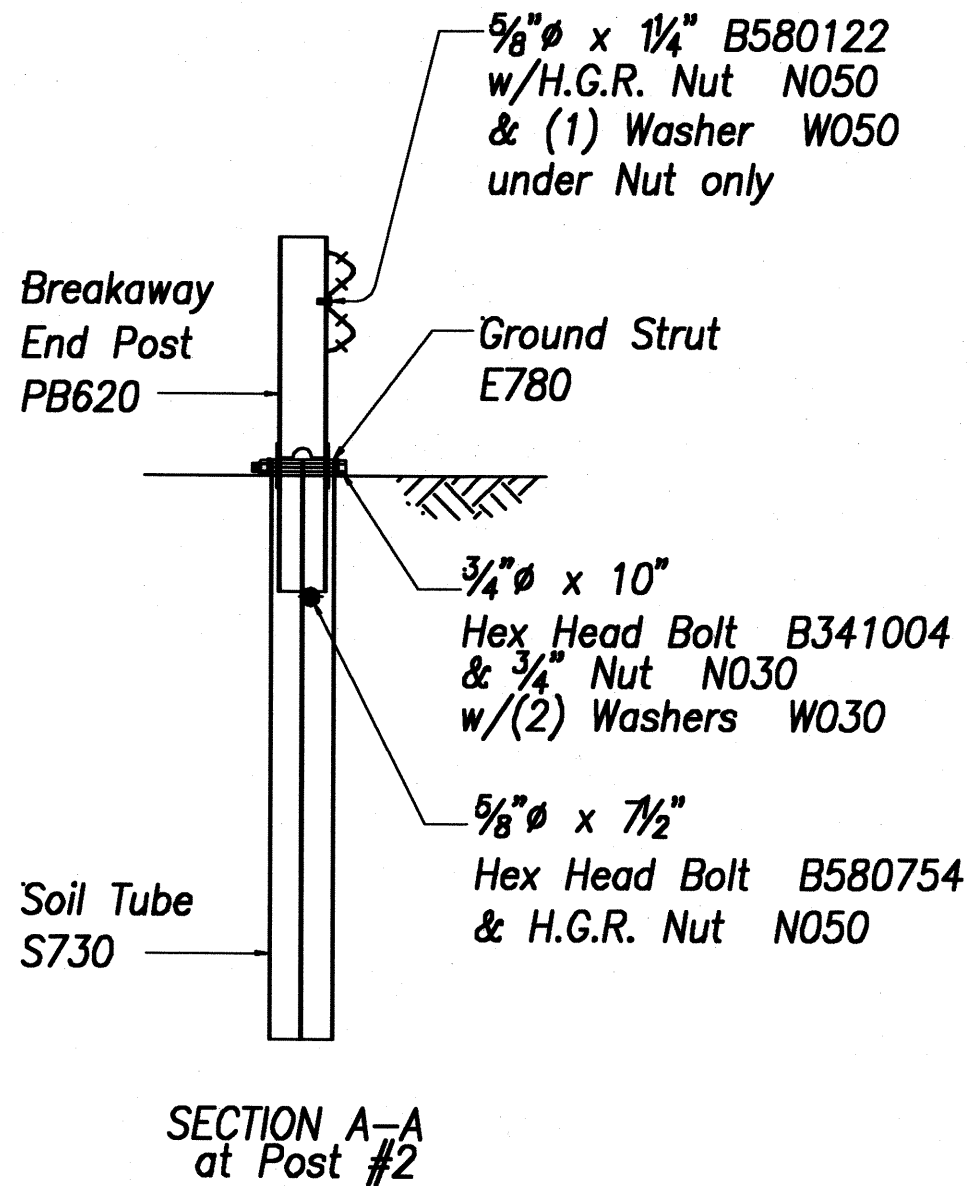
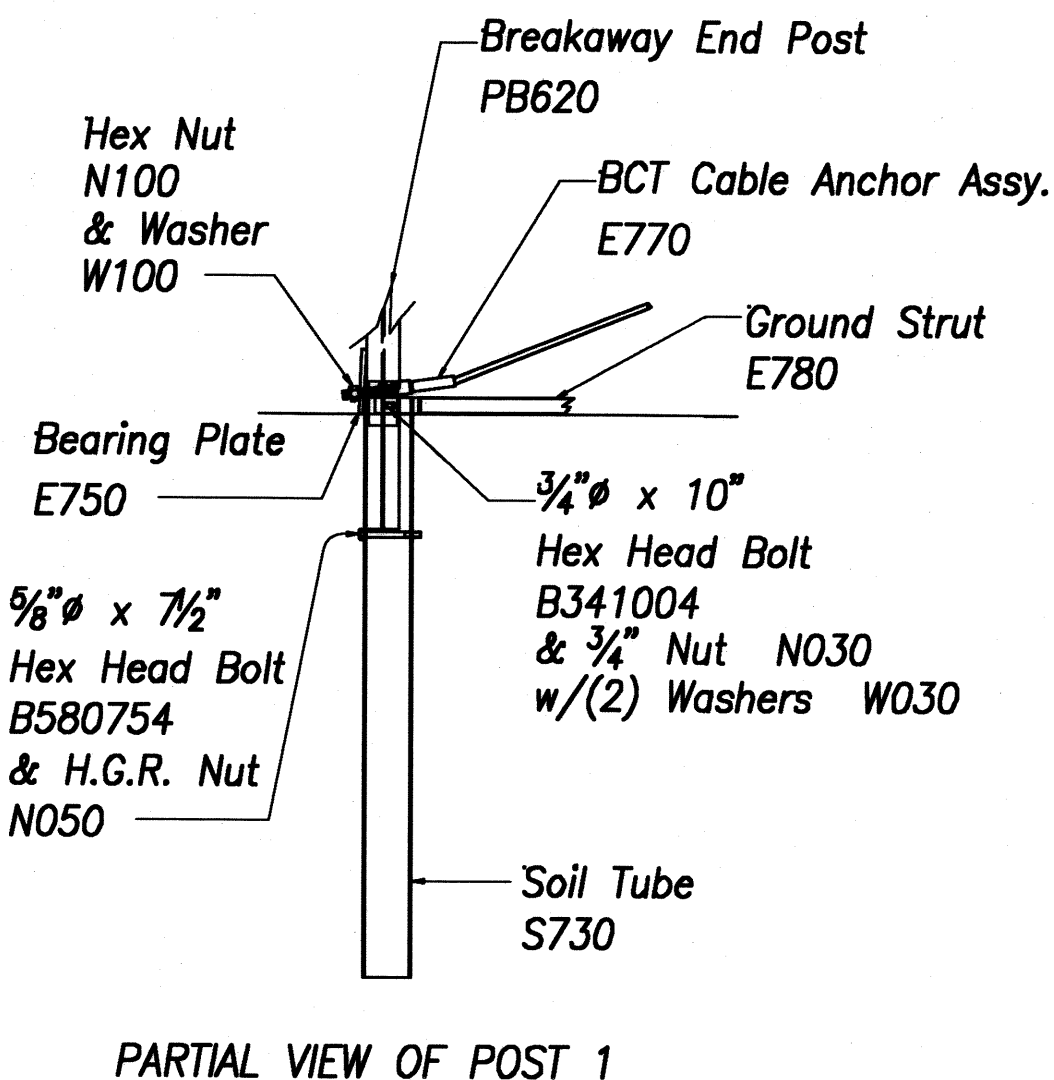
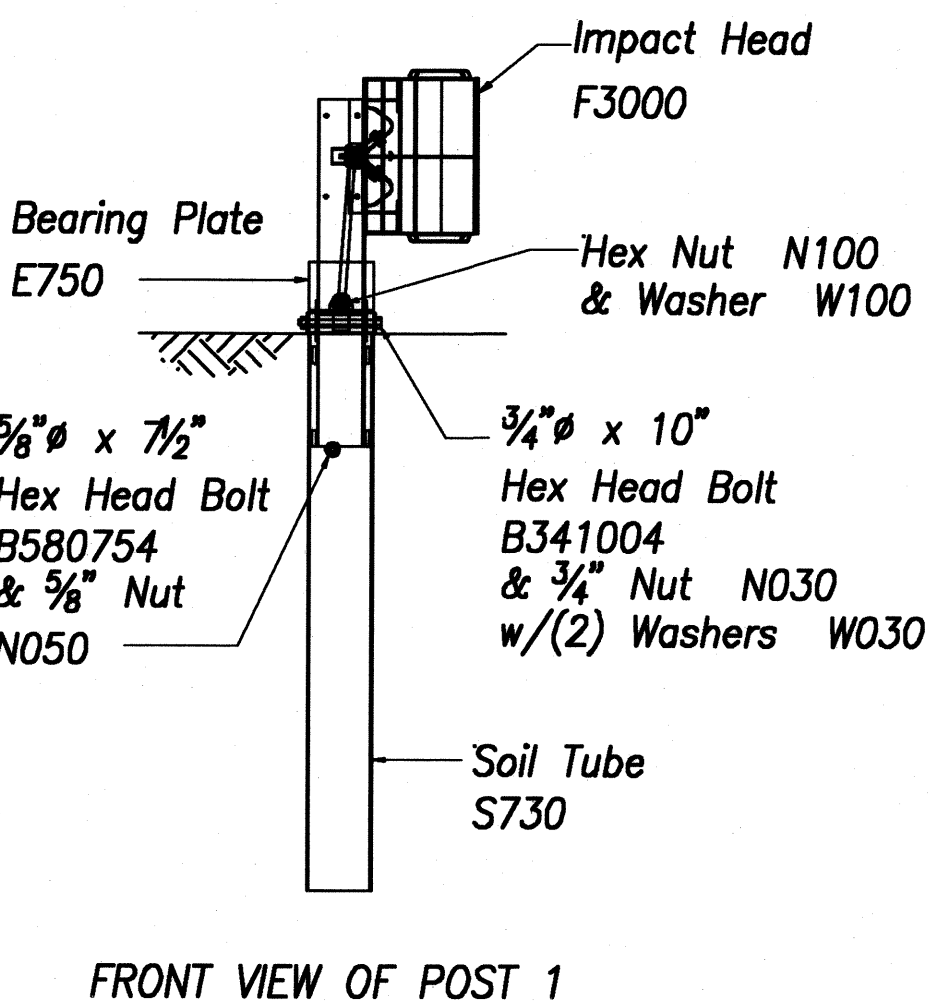
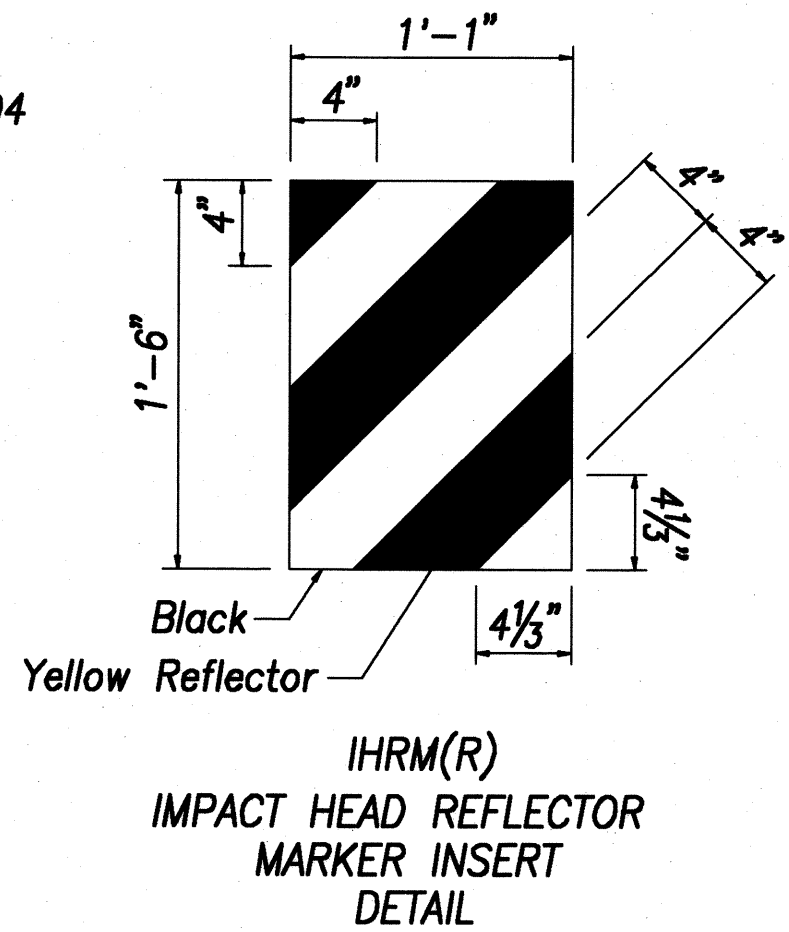
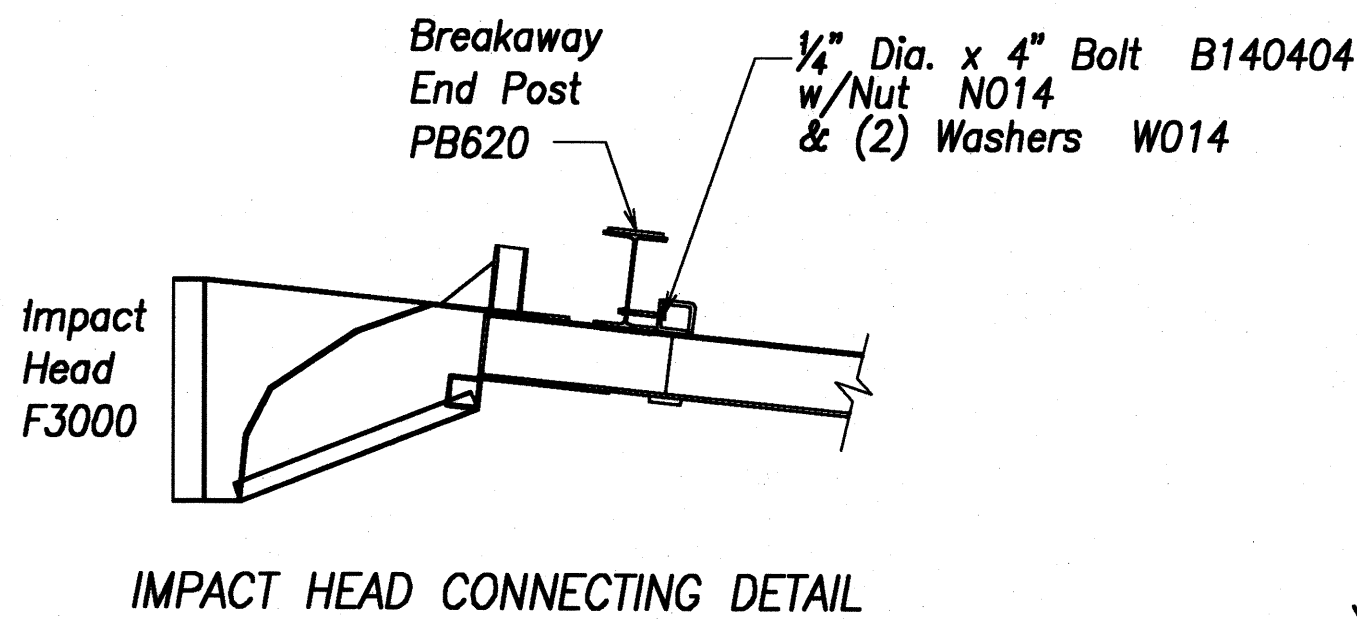
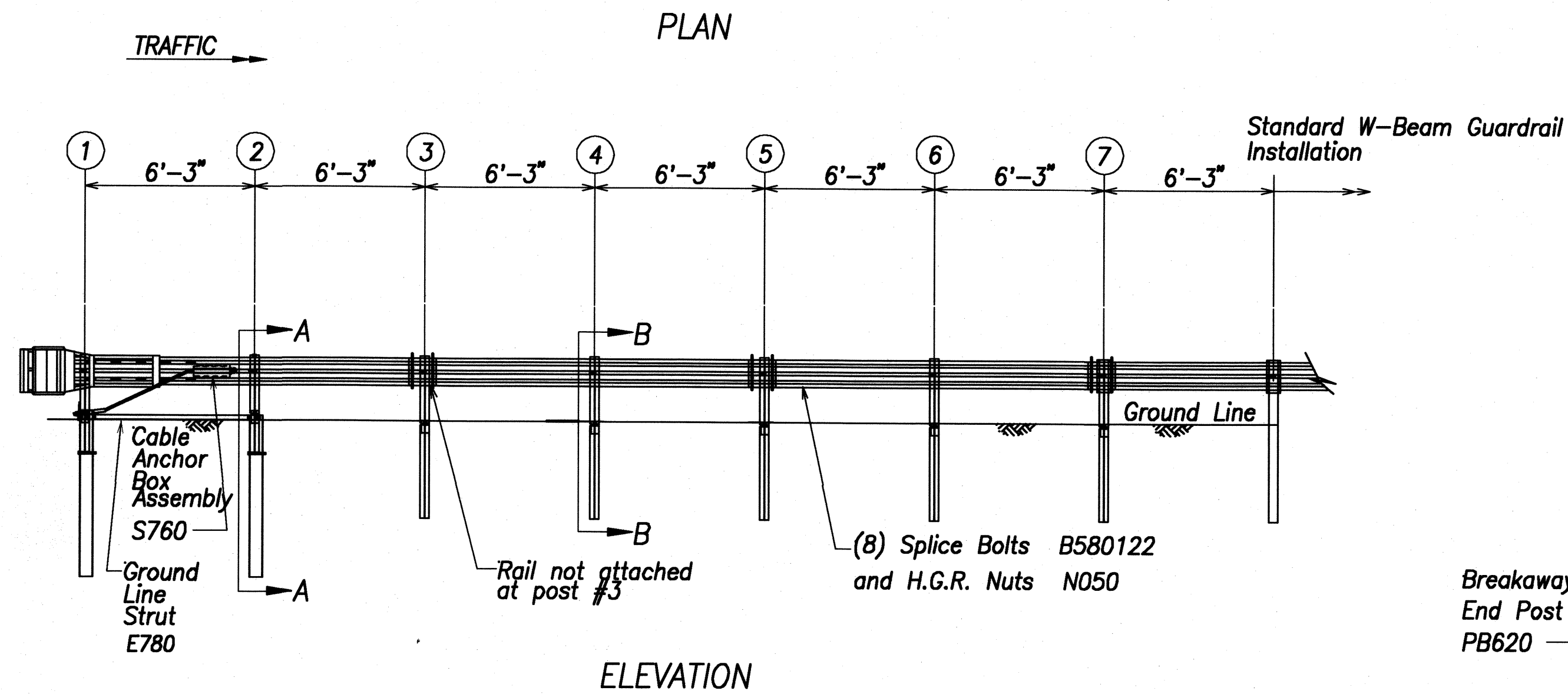
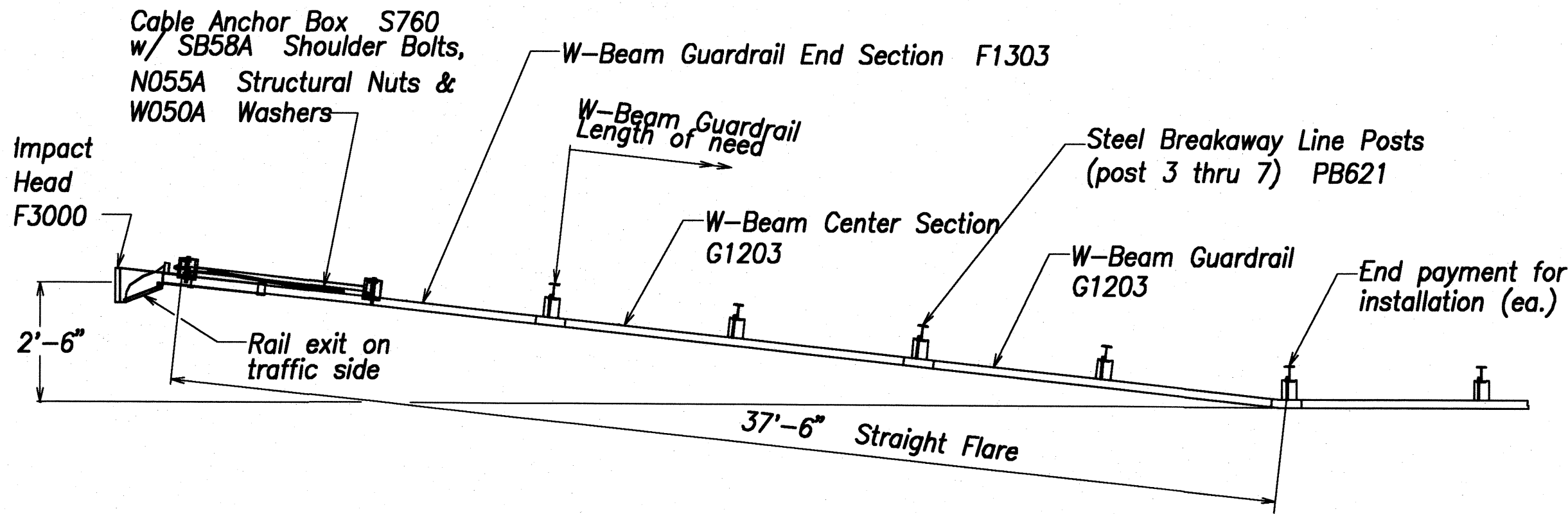
Scale: AS NOTED Date: MAY 2008

SHEET No. C-18 OF 19 SHEETS

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	...
DRAWN BY	...
NOTES BOOK	...
DESIGNED BY	...
QUANTITIES BY	...
CHECKED BY	...



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-K-01-03	2008	28	37



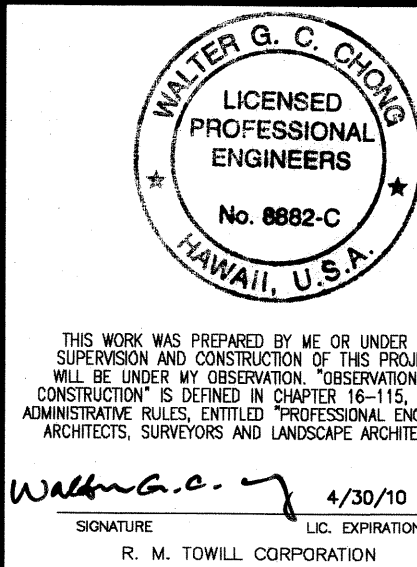
- GENERAL NOTES
- Breakaway steel posts are required with the FLEAT Terminal.
  - All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
  - The soil tubes shall not protrude more than 4" above ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
  - The soil tubes may be driven with an approved driving head. Soil tubes shall not be driven with the post in the tube. If the tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent settlement.
  - When rock is encountered during excavation, a 12" Dia. post hole, 20" deep may be used if approved by the engineer. Granular material will be placed in the bottom of the hole approx. 2 0" deep to provide drainage. The soil tubes will be field cut to length, placed in the hole and backfilled with adequately compacted material excavated from the hole.
  - The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening nuts.
  - (R) or (L) indicates right or left Impact Head Reflector Marker (IHRM). Providing and installing of IHRM shall be considered incidental to end treatment.
  - The stripes for IHRM shall slope downward at an angle of 45° towards the side of the end treatment that traffic is to pass.

ITEM NO.	QTY.	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA.
G1203	2	W-BEAM GUARDRAIL, 12 GA.
S730	2	*FOUNDATION SOIL TUBE, 6" x 8" x 72"
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
E780	1	GROUND STRUT
PB620	2	STEEL BREAKAWAY END POST
PB621	5	STEEL BREAKAWAY LINE POST
	5	RECYCLED PLASTIC BLOCKOUT OR OFFSET BLOCK
	1	IMPACT HEAD REFLECTOR MARKER - IHRM(R) OR (L)
HARDWARE		
B580122	25	5/8" Dia. x 1 1/4" SPLICE BOLT, POST #2
B580754	2	5/8" Dia. x 7/2" HEX BOLT
B341004	2	3/4" Dia. x 10" HEX BOLT
B581002	5	5/8" Dia. x 10" H.G.R. BOLT (POST 3 THRU 7)
N050	32	5/8" Dia. H.G.R. NUT (SPLICE 24, SOIL TUBES 2, POST 2 THRU 7, 6)
N030	2	3/4" Dia. HEX NUT
W050	6	H.G.R. WASHER
W030	4	3/4" ID WASHER
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B140404	2	1/4" x 4" HEX BOLT
N014	2	1/4" HEX NUT
W014	4	1/4" WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	1/2" A325 STRUCTURAL NUT
W050A	16	1 1/8" OD x 5/8" ID A325 STR. WASHER

Foundation Tube Options For Posts 1 & 2

- \*6'-0" Split Foundation Tubes S730
- \*6'-0" Solid Foundation Tubes E731
- \*5'-0" Foundation Tubes S735 W/Soil Plates SP600
- \*4'-6" Foundation Tubes E735 W/Soil Plates SP600

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	REV
DRAWN BY	WC
DESIGNED BY	WC
CHECKED BY	WC
NOTED BY	WC
QUANTITIES BY	WC
NO.	



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**GUARDRAIL DETAILS & NOTES**

*Kaunualii Highway, Kuhio Highway  
& Kuamoo Road Retaining Walls*  
Project No. HWY-K-01-03

Scale: AS NOTED Date: MAY 2008

SHEET No. C-19 OF 19 SHEETS