FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	58	75

reinforced earth®

EASTERN DIVISION - 2010 CORPORATE RIDGE SUITE 1000 McLEAN, VIRGINIA 22102 (703) 821-1175

GENERAL NOTES

DESIGN CRITERIA

■ 1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE REINFORCED EARTH VOLUME , METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED MATERIAL SHALL CONFORM TO THE CONTRACTING AGENCY'S TECHNICAL SPECIFICATIONS FOR REINFORCED EARTH WALLS .

■ 2. ASSUMED SOILS CHARACTERISTICS :

SELECT GRANULAR BACKFILL
Ø = 34 degrees , c = 0 p.s.f. , ɣ = 120 p.c.f.

RANDOM BACKFILL
Ø = 30 degrees , c = 0 p.s.f. , ɣ = 120 p.c.f.

FOUNDATION MATERIAL
Ø = 30 degrees , c = 0 p.s.f.

IF THE ACTUAL CHARACTERISTICS OF THE SOIL MATERIALS DIFFER FROM THOSE ABOVE, THE REINFORCED EARTH COMPANY SHOULD BE NOTIFIED PRIOR TO CONSTRUCTION TO EVALUATE THE NEED FOR REDESIGN OF THE WALL.

■ 3. THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE.

■ 4. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED EARTH VOLUME , AS DETERMINED BY THE ENGINEER , SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.

■ 5. REINFORCING STRIPS FOR REINFORCED EARTH WALLS SHALL BE 50MM WIDE AND 4MM THICK AND SHALL CONFORM TO THE PHYSICAL AND MECHANICAL PROPERTIES OF ASTM A-572 , GRADE 65 .

WALL CONSTRUCTION

■ 1. STATIONS SHOWN ARE ALONG CENTERLINE OF ROADWAY .

■ 2. REINFORCED EARTH WALLS , IN CURVES , WILL FORM A SERIES OF SHORT CHORDS OF 4.92' EACH TO MATCH DESIRED WALL ALIGNMENT .

☐ 3. FOR LOCATION AND ALIGNMENT OF REINFORCED EARTH WALLS , SEE CONTRACT DRAWINGS .

☐ 4. MANHOLES AND DROP INLETS SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS .

☐ 5. PILES WITHIN THE REINFORCED EARTH VOLUME SHALL BE DRIVEN PRIOR TO THE CONSTRUCTION OF THE REINFORCED EARTH WALL .

■ 6. BACKFILL MATERIAL SHALL BE COMPACTED , IN ACCORDANCE WITH THE SPECIFICATIONS FOR REINFORCED EARTH WALLS , TO A LEVEL OF 2" (±) ABOVE THE TIE STRIPS EMBEDDED IN THE PANELS . INSTALLATION OF REINFORCING STRIPS SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL .

■ 7. COMPACTION AND OPERATION EQUIPMENT SHALL BE KEPT A MINIMUM DISTANCE OF 3'-0" FROM BACK FACE OF REINFORCED EARTH PANEL . COMPACTION WITHIN 3'-0" OF THE REINFORCED EARTH PANELS SHALL BE ACHIEVED WITH AT LEAST THREE (3) PASSES OF A LIGHTWEIGHT MECHANICAL TAMPER , ROLLER OR VIBRATORY SYSTEM .

■ 8. FOR STRUCTURES IN EXCESS OF 20' IN HEIGHT , THE FINISHED GRADE IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS A HEIGHT OF 20' . FINISHED GRADE BACKFILL SHALL BE COMPACTED TO 95 % OF ASTM D-698 , METHODS 'C' OR 'D' , UNLESS OTHERWISE DIRECTED BY ENGINEER .

☐ 9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF GUARDRAIL POSTS BEHIND THE REINFORCED EARTH PANELS , PRIOR TO PLACEMENT OF THE TOP LAYER OF REINFORCING STRIPS . INDIVIDUAL STRIPS MAY BE SKEWED , IF AUTHORIZED BY THE REINFORCED EARTH COMPANY , PRIOR TO PLACEMENT . ANY DAMAGE DONE TO THE REINFORCING STRIPS DUE TO THE INSTALLATION OF THE GUARDRAIL SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE .

■ 10. IF STRUCTURES WITHIN THE REINFORCED EARTH VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING STRIPS , THE CONTRACTOR SHALL NOTIFY THE REINFORCED EARTH COMPANY TO DETERMINE THE EFFECT ON THE DESIGN OF THE WALL BY SKEWING THESE STRIPS .

■ 11. ALL DETAILING AND CHECKING OF REINFORCING STEEL FOR ANY C.I.P. CONCRETE WORK IS THE RESPONSIBILITY OF THE CONTRACTOR .

ESTIMATED QUANTITIES		
	SURFACE AREA (SQ. FT.)	BACKFILL (CU. YDS.)
WALL NO 1	8230	6,368
WALL NO 3	3998	2,617
TOTAL	12,228	8,985

■ NOTE APPLIES TO THIS PROJECT

☐ NOTE DOES NOT APPLY TO THIS PROJECT

ORIGINAL PLANS — NOT ISSUED FOR CONSTRUCTION
ISSUED FOR CONSTRUCTION — NOT ISSUED FOR BIDDING
ISSUED FOR BIDDING — NOT ISSUED FOR CONSTRUCTION
ISSUED FOR CONSTRUCTION — NOT ISSUED FOR BIDDING
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ISSUED FOR CONSTRUCTION — NOT ISSUED FOR BIDDING
ISSUED FOR BIDDING — NOT ISSUED FOR CONSTRUCTION
ISSUED FOR CONSTRUCTION
NOTE: DESIGN NO. ____

The Reinforced Earth Company
2710 Gateway Oaks Drive Suite 215-South Sacramento, Ca 95833
Telephone 916 649-9991

DESIGNED BY: GSM
PROJ. ENGR: [illegible]
CHECKED BY: GSH
DATE: 9-20-91

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

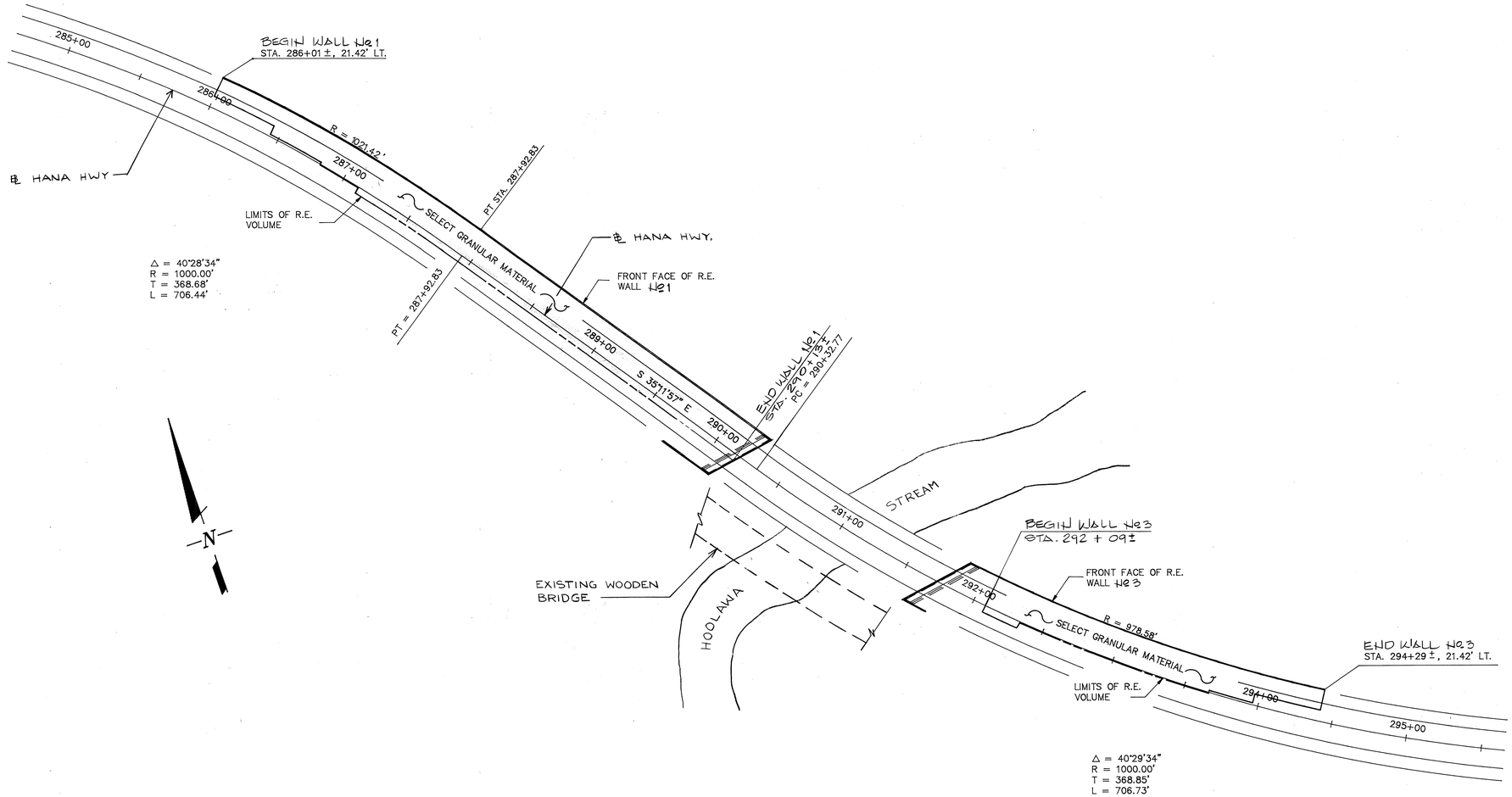
REINFORCED EARTH WALL
(ALTERNATE NO. 1)
GENERAL NOTES

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

SCALE: NO SCALE DATE: SEPT., 1991

SHEET NO. 1 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0860(6)	1992	59	75



PLAN VIEW

SCALE 1"=40'-0"

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

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2710 Gateway Oaks Drive Suite 215-South Sacramento, Ca 95833
Telephone 916 649-9991

DESIGNED BY: GSM	DATE
PROJ. ENGR: -/-/M	
CHECKED BY: GRH	9-20-91

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE REINFORCED EARTH COMPANY HAS DESIGNED, AND IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

"REINFORCED EARTH" IS THE REGISTERED TRADEMARK OF THE REINFORCED EARTH COMPANY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

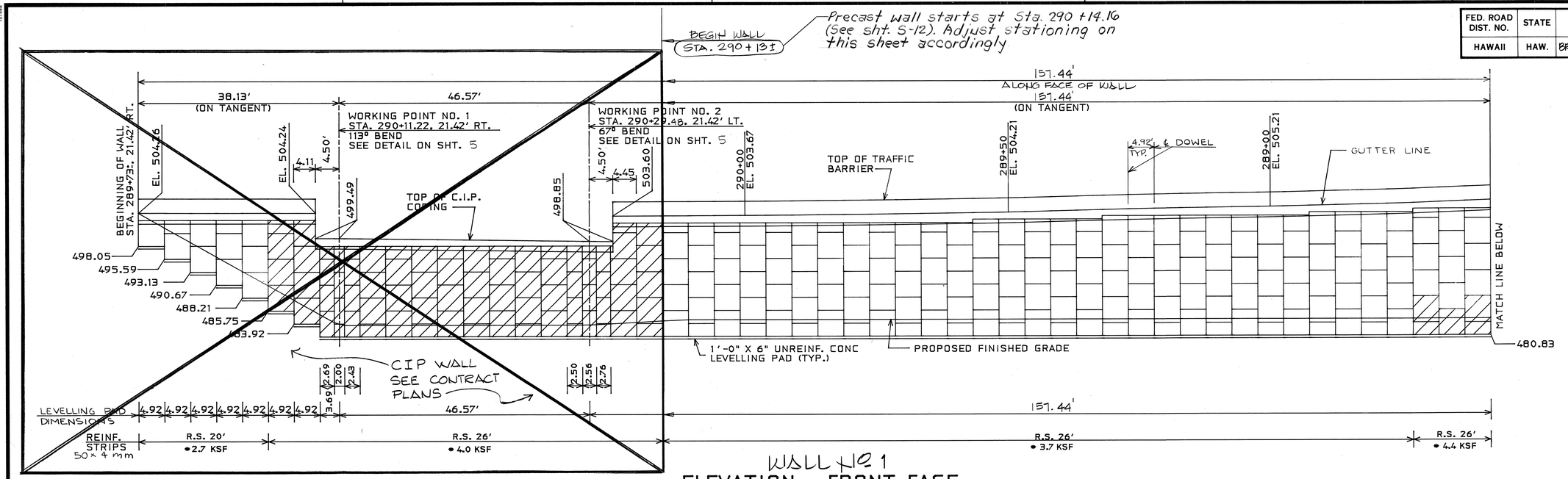
REINFORCED EARTH WALL
(ALTERNATE NO. 1)
PLAN VIEW

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0860(6)

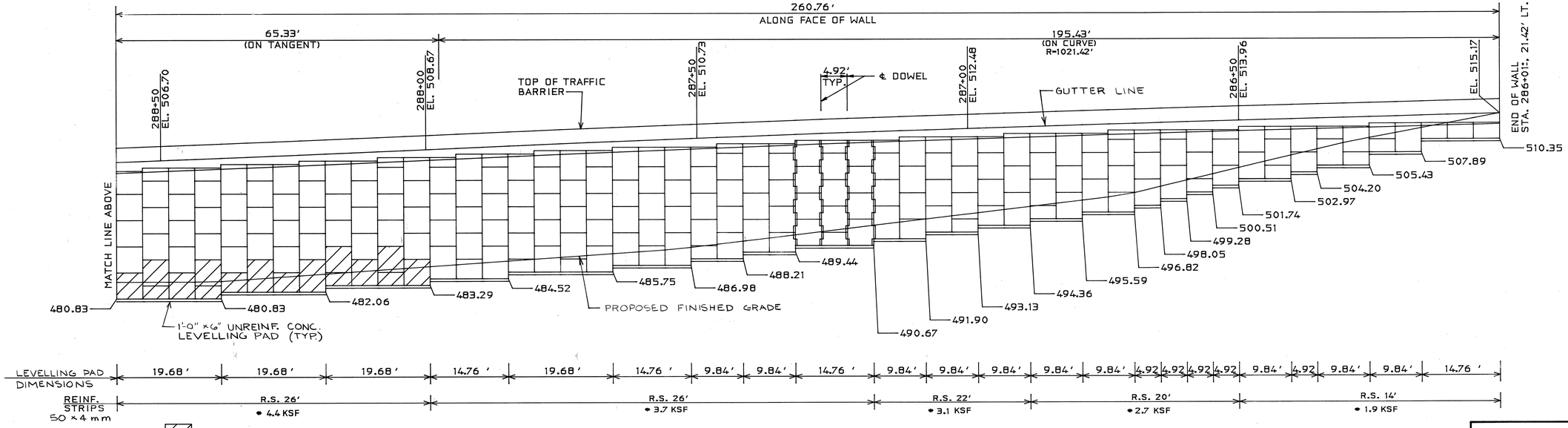
SCALE: 1"= 40' DATE: SEPT., 1991

SHEET No. 2 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	60	75



WALL NO 1
ELEVATION - FRONT FACE
SCALE : 1" = 10'



▨ - INDICATES THOSE PANELS WITH R7 REINFORCEMENT

WALL NO 1
ELEVATION - FRONT FACE
SCALE : 1" = 10'

• - MAXIMUM APPLIED BEARING PRESSURE AT TOE OF R.E. WALL SEE NOTE 3 SHT. 1

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

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Telephone 916 649-9991

DESIGNED BY: GSM	DATE
PROJ. ENGR: [illegible]	9-20-91
CHECKED BY: GRH	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

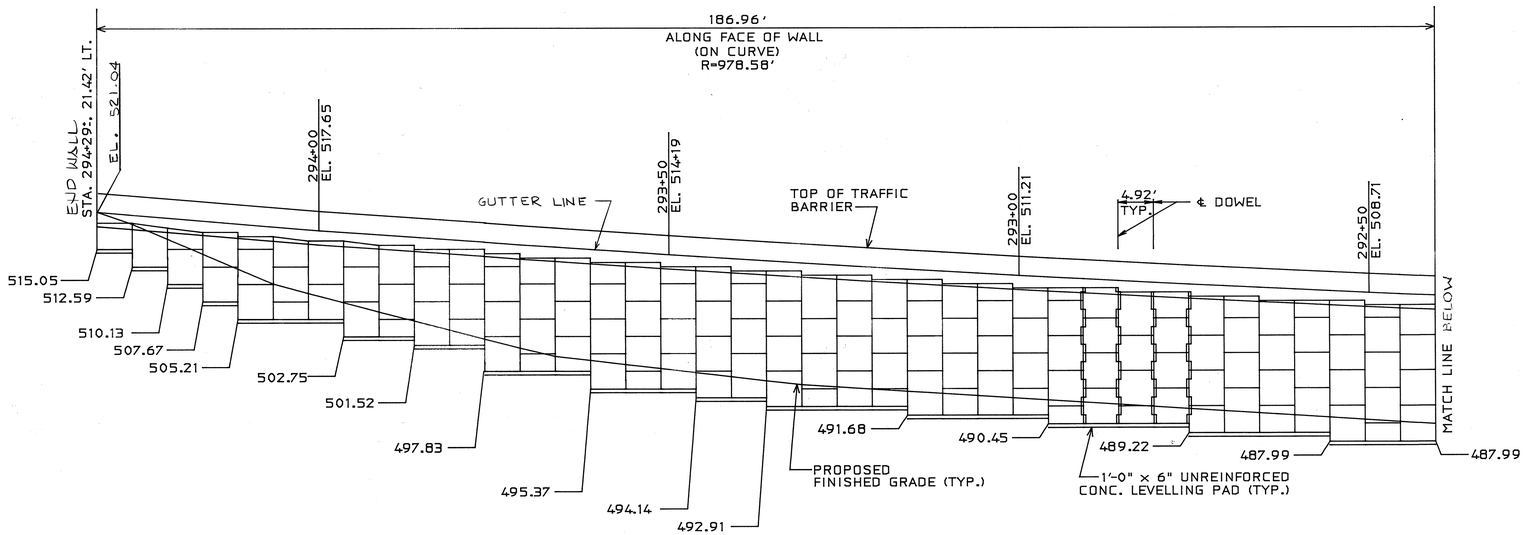
REINFORCED EARTH WALL
(ALTERNATE NO. 1)
ELEVATION

HOOLAWA BRIDGE REPLACEMENT
HANA HWY. HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

SCALE: 1" = 10' DATE: SEPT., 1991

SHEET No. 3 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-R3-0360(6)	1992	61	75



Precast wall starts at Sta. 292+09.65 (See sht. S-12). Adjust stationing on this sheet accordingly

BEGIN WALL STA. 292+09±

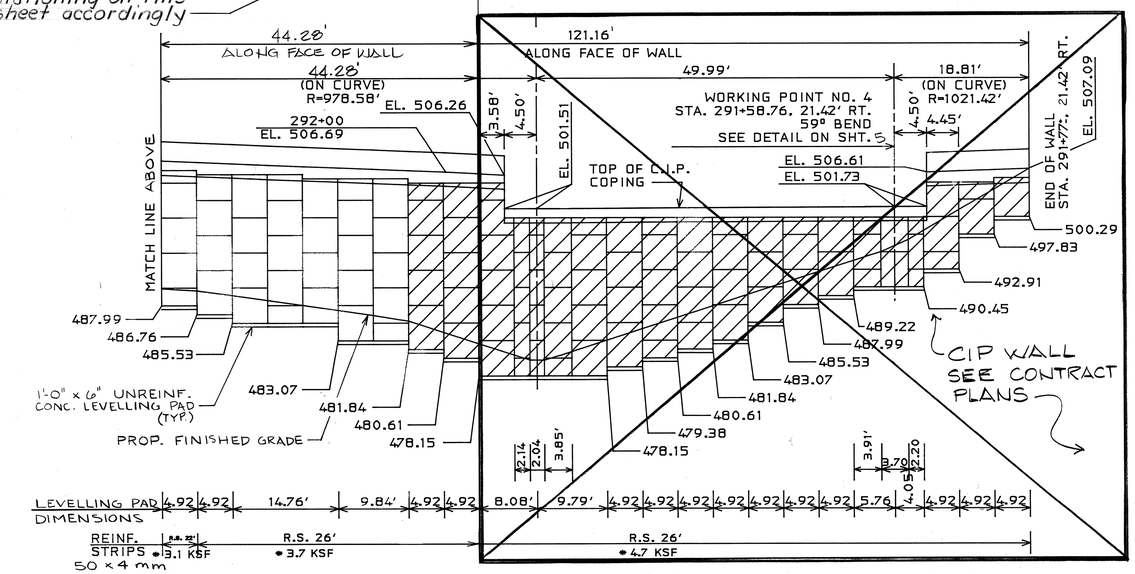
WALL NO 3

ELEVATION - FRONT FACE

SCALE : 1" = 10'

▨ - INDICATES THOSE PANELS WITH R7 REINFORCEMENT

* - MAXIMUM APPLIED BEARING PRESSURE AT TOE OF R.E. WALL SEE NOTE 3 SHT. 1



WALL NO 3

ELEVATION - FRONT FACE

SCALE : 1" = 10'

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

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2710 Gateway Oaks Drive Suite 215-South Sacramento, Ca 95833
Telephone 916 649-9991

DESIGNED BY: GSM	DATE
PROJ. ENGR: -/-	
CHECKED BY: GEH	9-20-91

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

REINFORCED EARTH WALL
(ALTERNATE NO. 1)

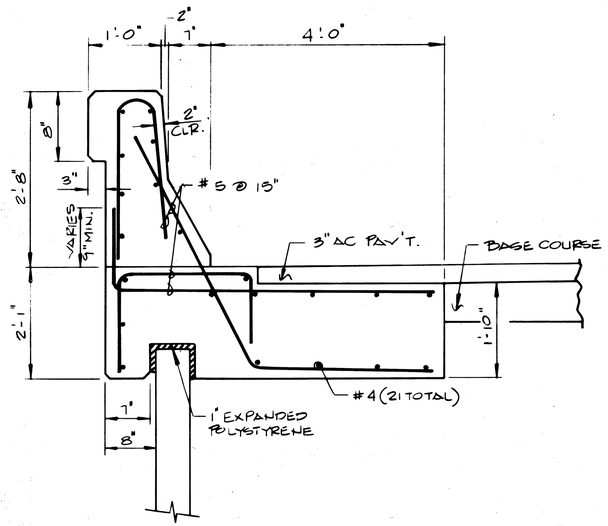
ELEVATION

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

SCALE: 1"=10' DATE: SEPT., 1991

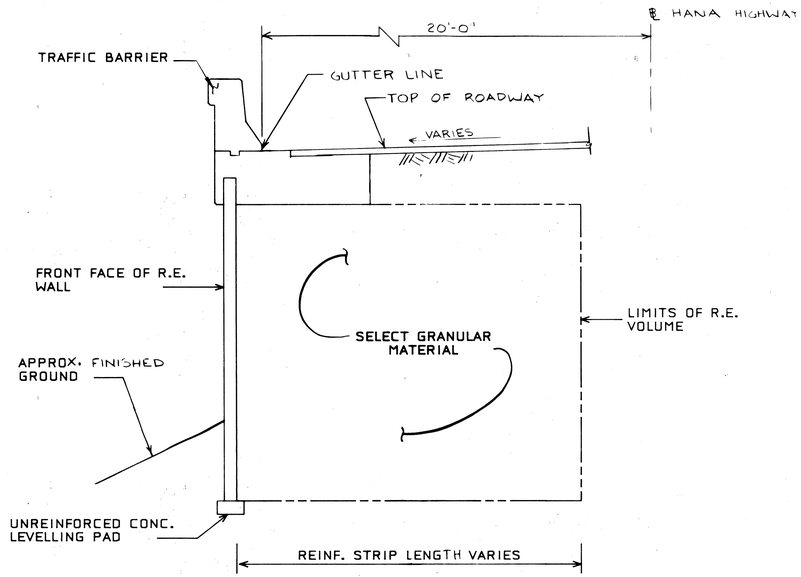
SHEET No. 4 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	BR-RS-0360(6)	1992	62	75



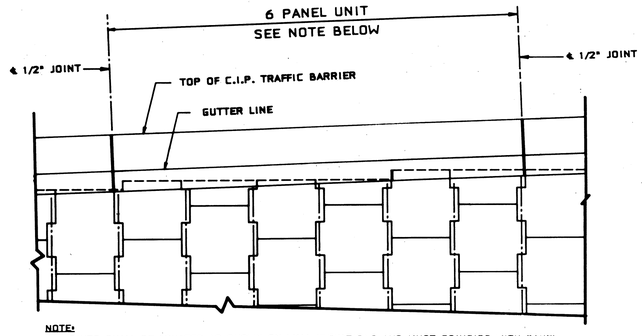
TRAFFIC BARRIER DETAIL

SCALE: 1" = 1'-0"



TYPICAL SECTION WITH TRAFFIC BARRIER

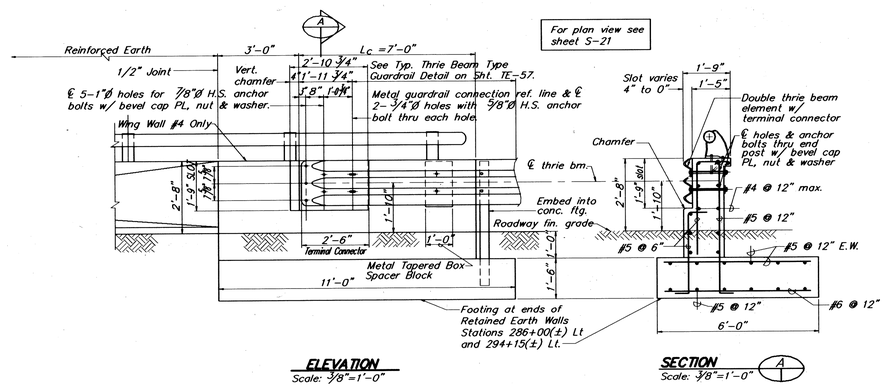
SCALE: 3/8" = 1'-0"



NOTE:
ALL JOINTS SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS AND MUST COINCIDE WITH PANEL JOINT ON FRONT FACE WHERE BOTTOM OF LIP INTERSECTS WITH PANEL JOINT.

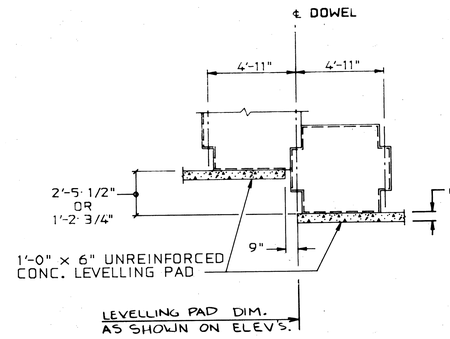
C.I.P. TRAFFIC BARRIER PARTIAL ELEVATION

SCALE: 3/16" = 1'



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

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



TYPICAL LEVELLING PAD STEP DETAIL

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

NOTE:
LEVELLING PAD MUST BE POURED TO THE DESIGN ELEVATIONS AS SHOWN ON THE WALL ELEVATION VIEWS. THE ALLOWABLE ELEVATION TOLERANCES ARE 0.01'(+) AND 0.02'(-). PRECAST PANEL JOINT FILLER MATERIAL IS NOT PERMITTED BETWEEN PRECAST PANEL AND LEVELLING PAD UNLESS AUTHORIZED IN WRITING BY THE REINFORCED EARTH COMPANY.

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

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reinforced earth
The Reinforced Earth Company
2710 Gateway Oaks Drive Suite 215-South Sacramento, Ca 95833
Telephone 916 648-9991

DESIGNED BY: GSM
PROJ. ENGR: [illegible]
CHECKED BY: GRH
DATE: 9-20-91

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

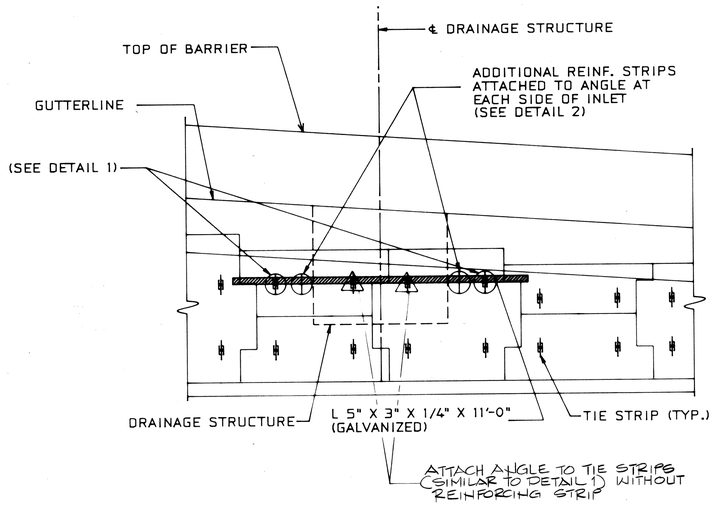
REINFORCED EARTH WALL (ALTERNATE NO. 1) DETAILS

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

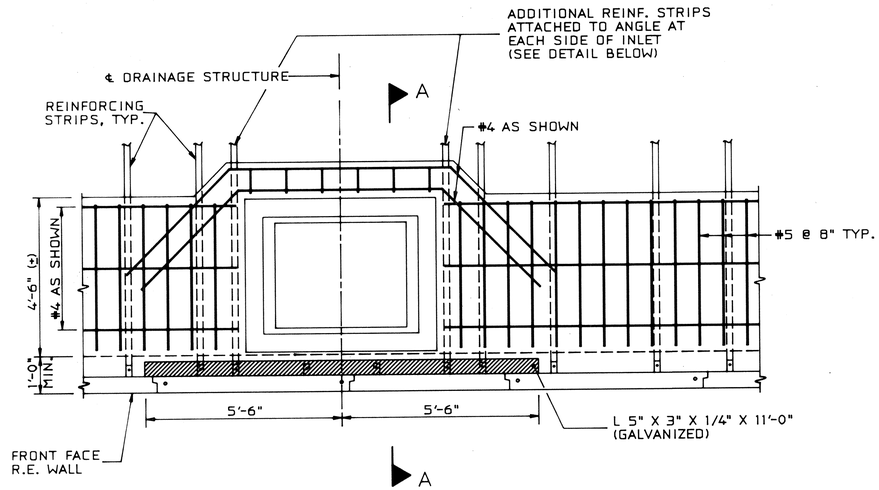
SCALE: AS NOTED DATE: SEPT., 1991

SHEET NO. 5 OF 7 SHEETS

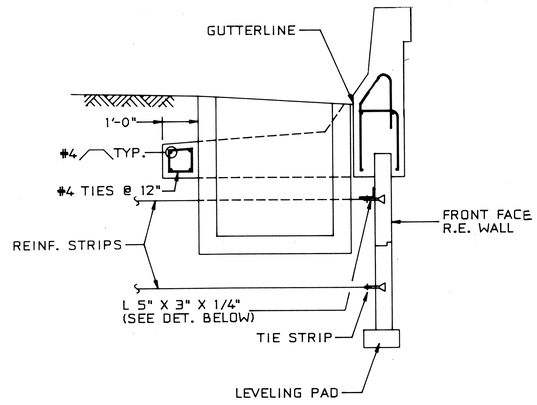
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	63	75



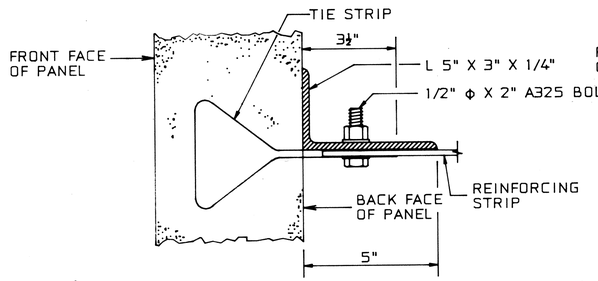
BARRIER INLET DETAIL
SCALE : 3/8" = 1'-0"



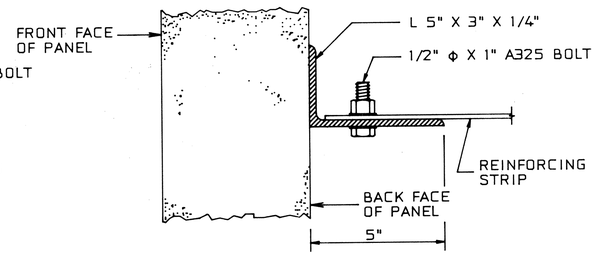
PLAN - JUNCTION SLAB @ INLET
SCALE : 1/2" = 1'-0"



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



CONNECTION DETAIL 1
SCALE : 3/8" = 1"



CONNECTION DETAIL 2
SALE : 3/8' = 1"

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

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2710 Gateway Oaks Drive Suite 215-South Sacramento, Ca 95833
Telephone 916 649-9991

DESIGNED BY: GSM	DATE
PROJ. ENGR: JPM	9-20-91
CHECKED BY: GRH	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

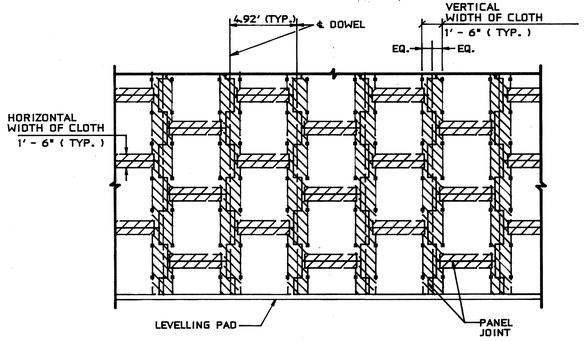
REINFORCED EARTH WALL
(ALTERNATE NO. 1)
DETAILS

HOOLAWA BRIDGE REPLACEMENT
HANA HWY, HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

SCALE: AS NOTED DATE: SEPT., 1991

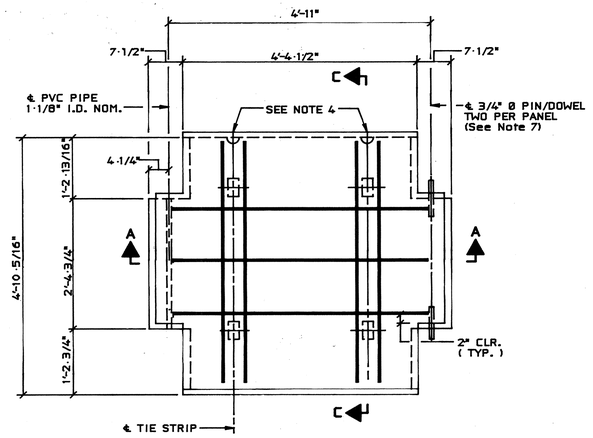
SHEET No. 6 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	64	75

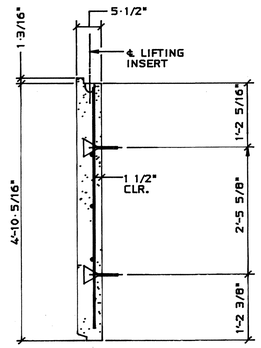


NOTE:
STRIPS OF FILTER CLOTH SHALL BE PLACED ON BACK FACE OF PANEL , OVER PANEL JOINTS . FILTER CLOTH SHALL BE ADHERED TO BACK FACE OF PANELS USING AN ADHESIVE COMPOUND SUPPLIED BY THE REINFORCED EARTH COMPANY .

FILTER CLOTH DETAIL
PARTIAL ELEVATION - BACK FACE
SCALE : 3/16" = 1' - 0"



PANEL TYPE "A"
WITH R4 REINFORCEMENT
FRONT VIEW
SCALE : 3/4" = 1' - 0"

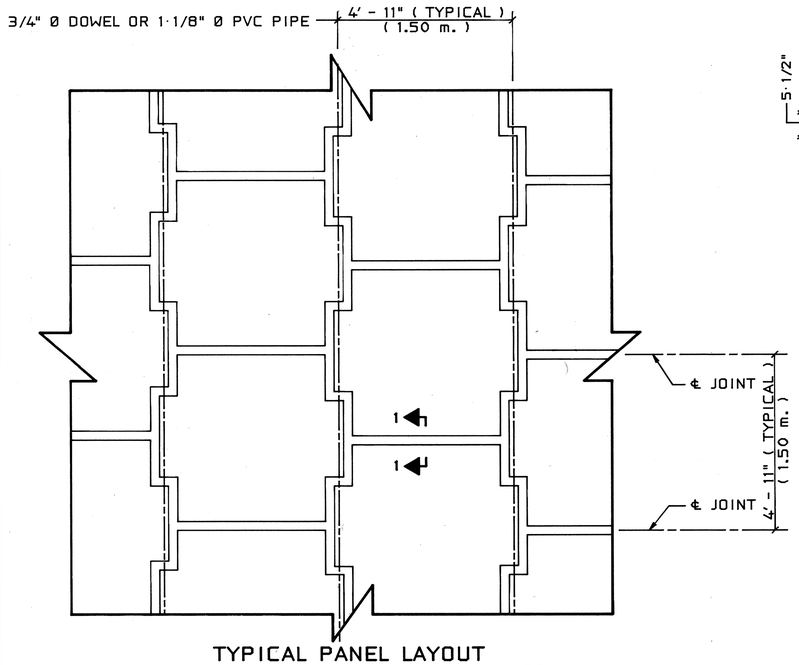


SECTION C-C
SCALE : 3/4" = 1' - 0"

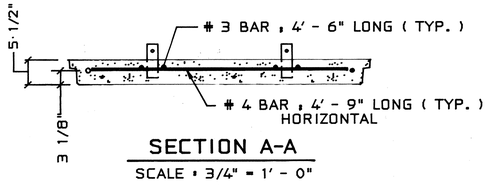
PANEL THICKNESS	REINFORCEMENT DESIGNATION	PANEL REINFORCEMENT	MAXIMUM ALLOWABLE HORIZONTAL STRESS AT FACING (KSF)
5½"	R4	4-#3 VERTICAL 3-#4 HORIZONTAL	1.01
	R6	6-#3 VERTICAL 4-#4 HORIZONTAL	1.33
	R7	6-#4 VERTICAL 4-#6 HORIZONTAL	2.58

NOTES :

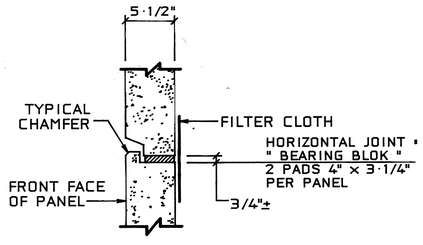
1. REINFORCING STEEL TO BE A615 GRADE 60 .
2. 3/8" x 3/8" CHAMFER SHALL BE PROVIDED ON ALL EXPOSED EDGES (FRONT FACE ONLY) .
3. ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILED ON SHOP DRAWINGS .
4. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF ONE TON CAPACITY EACH .
5. PANEL DESIGN THICKNESS IS 5 1/2" . THICKNESS OF CONCRETE MUST INCREASE TO ACCOMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
6. ACTUAL PANEL REINFORCEMENT FOR ALL PANEL TYPES ON THIS PROJECT IS DESIGNATED ABOVE . R4 ILLUSTRATED FOR INFORMATION ONLY .
7. EACH 3/4" Ø DOWEL SHALL HAVE A MIN. LENGTH OF 10" . DOWELS MAY BE GALVANIZED STEEL OR PVC ROD . A SINGLE FULL LENGTH DOWEL MAY BE USED AT THE DISCRETION OF THE MANUFACTURER .



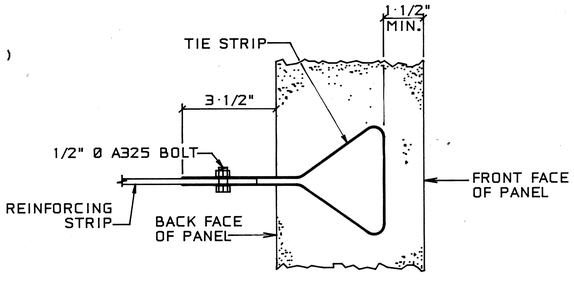
TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE
SCALE: 1/2" = 1' - 0"



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



SECTION 1-1
N.T.S.



CONNECTION DETAIL
NO SCALE

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

DESIGNED BY: GSM	DATE
PROJ. ENGR: dpM	
CHECKED BY: GRH	9-20-91

reinforced earth
The Reinforced Earth Company
2710 Gateway Oaks Drive Suite 215-South Sacramento, Ca 95833
Telephone 916 649-9991

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE REINFORCED EARTH COMPANY HAS DESIGNED, AND IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

"REINFORCED EARTH" IS THE REGISTERED TRADEMARK OF THE REINFORCED EARTH COMPANY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

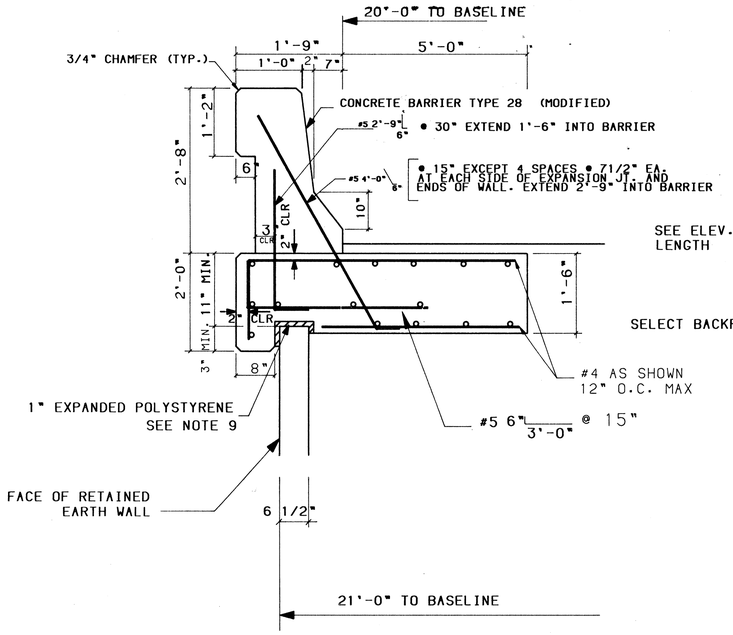
REINFORCED EARTH WALL
(ALTERNATE NO. 1)
STANDARD PANEL DETAILS

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

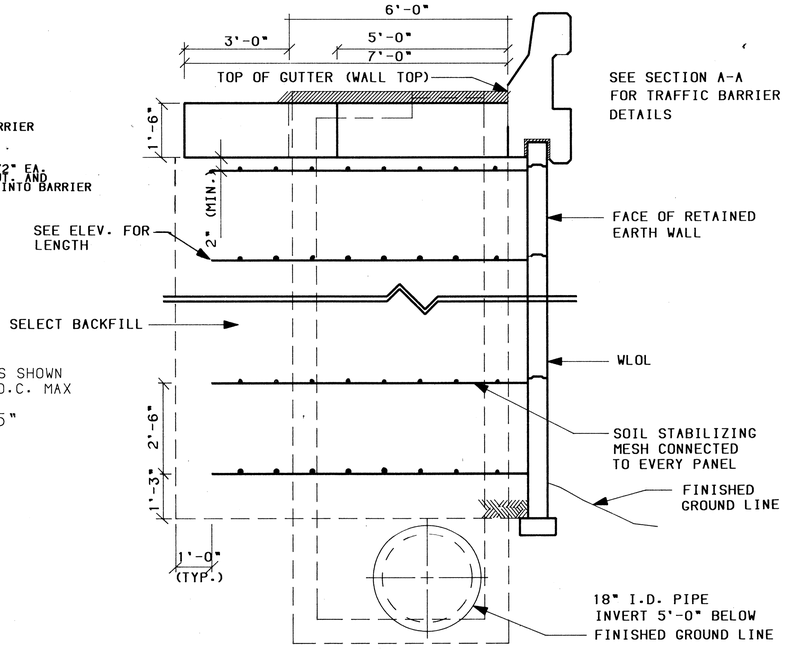
SCALE: AS NOTED DATE: SEPT., 1991

SHEET No. 7 OF 7 SHEETS

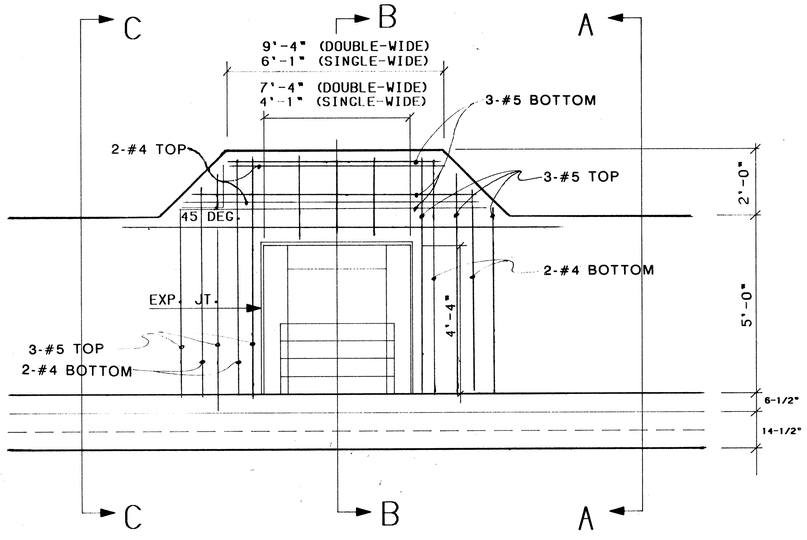
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	65	75



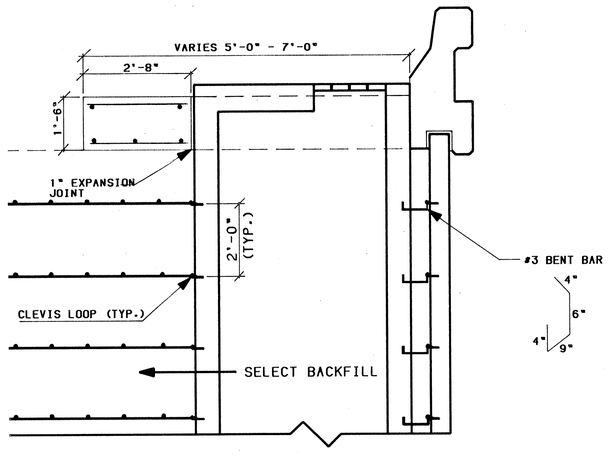
SECTION A-A



SECTION C-C



PLAN VIEW DRAIN DETAIL



SECTION B-B

CONSTRUCTION NOTES

1. NO HORIZONTAL JOINT MATERIAL IS REQUIRED BETWEEN THE LEVELING PAD AND THE FIRST ROW OF PANELS.
2. ENOUGH C-CLAMPS MUST BE SUPPLIED BY THE CONTRACTOR TO SECURE ALL PANELS ALONG ONE COMPLETE LIFT.
3. EACH C-CLAMP REMAINS IN POSITION UNTIL IT MUST BE REMOVED TO ALLOW ACCESS FOR PLACING OF THE NEXT FACING PANEL.
4. WHEN PLACING THE SPECIFIED BACKFILL MATERIAL, THE FOLLOWING PROCEDURE IS TO BE PERFORMED:
   A. NO HEAVY EQUIPMENT SHALL BE WITHIN THREE FEET OF THE PANEL BACK.
   B. THE AREA THREE FEET BEHIND THE PANEL SHALL BE PLACED LAST.
5. CARE SHOULD BE TAKEN TO NOT ALLOW ANY HARD WHEELED PLACING OR COMPACTING EQUIPMENT TO RUN DIRECTLY ON TOP OF THE REINFORCING MESH UNTIL THE MESH HAS BEEN COVERED WITH FILL MATERIAL.
6. THE AREA THREE FEET BEHIND THE FACING PANELS SHALL BE COMPACTED BY MEANS OF A HAND COMPACTOR.
7. AS THE SELECT BACKFILL IS PLACED, THE OUTSIDE BERM SHOULD BE CONSTRUCTED CONSECUTIVELY. ALWAYS PLACE THE BACKFILL TO THE REQUIRED ELEVATION; FOLLOW BY PLACING THE BERM MATERIAL.
8. AT THE END OF THE DAY, SLOPE THE SELECT BACKFILL AWAY FROM THE FACING PANELS TO PROVIDE ADEQUATE DRAINAGE.

CONSTRUCTION SEQUENCE

1. EXCAVATE THE AREA REQUIRED FOR THE FOUNDATION OF THE "RETAINED EARTH" STRUCTURE TO THE ELEVATION INDICATED ON THE PLANS. CARE SHOULD BE TAKEN TO ASSURE THAT THE WIDTH OF THE EXCAVATION MEETS OR EXCEEDS THE TOTAL OVERALL LENGTH OF THE SOIL REINFORCEMENT MESH.
2. CHECK THE SOIL FOR ADEQUATE BEARING CAPACITY. THE SOIL SHALL BE COMPACTED WITH THE AID OF A SMOOTH WHEEL VIBRATORY ROLLER.
3. CAST A 6" x 12" UNREINFORCED CONCRETE LEVELING PAD UNDER THE WALL PANEL CENTER-LINE AS SHOWN ON THE PLANS. NO DOWELS, INSERTS, OR KEYWAY JOINTS ARE REQUIRED.
4. BEGIN ERECTING THE FIRST LIFT OF FULL AND HALF PANELS. CARE SHOULD BE TAKEN TO EXACTLY POSITION ALL BOTTOM PANELS SINCE THIS PROVIDES THE SPACING REQUIREMENTS FOR THE REMAINDER OF THE WALL PANELS. INSERT THE STEEL ROD ALIGNMENT PINS IN THE HOLES PROVIDED ON EACH INCLINED SURFACE.
5. ADEQUATELY BRACE FULL FACING PANELS FROM THE OUTSIDE FACE TO THE EXISTING GROUND WITH 1/4" PER 5" BATTER. C-CLAMP THE HALF PANELS TO THE FULL PANELS.
6. USING THE ADHESIVE SUPPLIED, GLUE THE FILTER CLOTH TO THE INCLINED JOINTS BETWEEN THE PANELS.
7. PLACE AND COMPACT THE FIRST LAYER OF SELECT BACKFILL UNTIL IT REACHES THE ELEVATION OF THE FIRST ROW OF LOOP EMBEDS ON THE BACK SURFACE OF THE PANEL. THIS MATERIAL SHOULD BE PLACED IN 8" LIFTS AND COMPACTED TO 90% STANDARD PROCTOR DENSITY. (NOTE: THE TOP THREE FEET OF THE SELECT BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.)
8. PLACE SOIL REINFORCING MESH AND ATTACH TO THE PANEL BY USING THE CONNECTOR BAR PROVIDED.
9. PLACE AND COMPACT ADDITIONAL SELECT BACKFILL MATERIAL, AS DIRECTED IN STEP 7, UNTIL THE ELEVATION REACHES THE BOTTOM OF THE NEXT ROW OF FACING PANELS.
10. PLACE TWO 3/4" x 2 3/4" x 11 1/2" HIGH DENSITY POLYETHYLENE BEARING PADS ON THE TOP OF THE HORIZONTAL SURFACE OF THE IN-PLACE FACING PANELS.
11. ERECT THE NEXT LIFT OF FACING PANELS. POSITION THESE PANELS AND C-CLAMP THEM TO THE ADJACENT ROW. ADJUST BY USING WOOD SHIMS PLACED IN THE C-CLAMPS. NO FURTHER BRACING IS REQUIRED.
12. GLUE THE FILTER CLOTH TO BOTH THE HORIZONTAL AND INCLINED JOINTS.
13. PLACE AND COMPACT THE SELECT BACKFILL MATERIAL, AS DIRECTED IN STEP 7, UNTIL IT REACHES THE NEXT ROW OF LOOP EMBEDS.
14. REPEAT STEPS 8 THRU 13 UNTIL THE WALL HAS REACHED THE REQUIRED HEIGHT.

EARTHWORK

EXCAVATION AND BACKFILL SHALL CONFORM TO THE PROVISIONS IN SECTION 19, "EARTHWORK," OF THE STANDARD SPECIFICATIONS, THESE PROVISIONS, AND THE FOLLOWING:

BACKFILL MATERIAL.--

1. STRUCTURAL BACKFILL SHALL CONSIST OF IMPORTED MATERIAL FREE FROM ORGANIC OR ANY OTHER UNSUITABLE MATERIAL AS DETERMINED BY THE ENGINEER, AND MEETING THE FOLLOWING REQUIREMENTS:

PROPERTY	VALUE	AASHTO
GRADATION SIEVE SIZE	PERCENT PASSING INDIVIDUAL TEST MOVING RESULTS	T-27
4"	100	
NO. 40*	0-60	
NO. 200	0-15	
PLASTICITY INDEX	LESS THAN 6	T-90
RESISTIVITY	GREATER THAN 3000 OHM-CM	643
CHLORIDES	200 PPM MAX.	422
SULFATES	1000 PPM MAX.	417
PH	5-10	643

2. IN ADDITION, THE SAND EQUIVALENT AND PLASTICITY INDEX REQUIREMENTS SHALL BE MODIFIED BY THE GRADUATION TEST RESULTS: IF 12% OR LESS PASSES THE No.200 SIEVE AND 50% OR MORE IS RETAINED ON THE No. 4 SIEVE , THE SAND EQUIVALENT AND PLASTICITY INDEX REQUIREMENTS ARE NOT APPLICABLE.
3. BACKFILL PLACEMENT. BACKFILL SHALL BE PLACED AND COMPACTED SIMULTANEOUSLY WITH THE ERECTION OF THE FACING PANELS. PLACEMENT AND COMPACTION SHALL BE ACCOMPLISHED WITHOUT DISTORTION OF THE MAT REINFORCEMENTS OR THE FACING MEMBERS.
4. BACKFILL MATERIAL SHALL BE PLACED IN LAYERS OF UNIFORM THICKNESS OF APPROXIMATELY 0.67 FOOT LIFTS AND COMPACTED TO A RELATIVE COMPACTION OF AT LEAST 95% (AASHTO T-99) WHEN TESTED PER WITH CALIFORNIA METHOD 216. IF THE BACKFILL GRADUATION IS AS FOLLOWS:

SIEVE SIZE	PERCENTAGE PASSING
3/4"	GREATER THAN 30%
No. 200	LESS THAN 15%

THE BACKFILL MATERIAL SHOULD BE COMPACTED TO A RELATIVE DENSITY OF AT LEAST 95% WHEN TESTED IN ACCORDANCE WITH ASTM 4253 AND 4254.

5. SHEEPS FOOT OR GRID-TYPE ROLLERS SHALL NOT BE USED FOR COMPACTING MATERIAL WITHIN THE LIMITS OF THE EARTH REINFORCEMENT, UNLESS APPROVED BY THE RESIDENT ENGINEER. HAND-HELD OR HAND-GUIDED COMPACTING SHALL BE USED TO COMPACT BACKFILL MATERIAL WITHIN 3 FEET OF THE FACING MEMBER. NO SOIL DENSITY TESTS NEED BE TAKEN IN THIS ZONE.
6. BEFORE PLACEMENT OF THE WELDED WIRE MAT REINFORCEMENT, THE BACKFILL MATERIAL FROM 3 FEET BEYOND THE BACK FACE OF THE FACING PANEL TO END OF THE MAT SHALL BE ROUGHLY LEVELED TO 0.05 TO 0.15 FEET ABOVE THE ELEVATION OF THE ANCHORAGE ASSEMBLY.

DESIGN PARAMETERS

UNIT WEIGHT OF BACKFILL	120 PCF
ANGLE OF INTERNAL FRICTION:	
- SELECT BACKFILL	34°
- RANDOM BACKFILL	30°
- FOUNDATION	30°
MAXIMUM BEARING CAPACITY:	3 TSF
TRAFFIC SURCHARGE:	240 PSF
DESIGN LIFE:	75 YRS

* SEE NOTE BELOW

* NOTE: REVIEWING ENGINEER TO VERIFY BEARING CAPACITY ALONG THE WALL, AND BEARING PRESSURE OVER DRAIN PIPE.

DESIGN OF ALL WALLS IS BASED ON THE ASSUMPTION THAT ALL MATERIALS, INCLUDING THE RETAINED EARTH BACKFILL AND METHODS OF CONSTRUCTION CONFORM TO THE SPECIFICATIONS FOR RETAINED EARTH WALLS.

THESE DRAWINGS ARE CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF RETAINED EARTH STRUCTURES ONLY.

RE-1
SHEET: ___ OF: ___

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

RETAINED EARTH ™ WALLS
CONSTRUCTION NOTES AND DETAILS

STATE OF HAWAII D.O.T.
PROJECT HOOLAWA BRIDGE REPLACEMENT
CONTRACT NO. FAIP-BR-RS-0360(6)
CONTRACTOR:

1077 Dell Avenue
Campbell, California 95008
Telephone: 408/866-5000
Telex: 5101004324

VSL CORPORATION

ATLANTA, GA / CAMPBELL, CA / DALLAS-FORT WORTH, TX / DENVER, CO / HONOLULU, HI / HOUSTON, TX / KANSAS CITY, KS
LOS GATOS, CA (CORPORATE OFFICE) / LOS ANGELES, CA / MIAMI, FL / MINNEAPOLIS, MN / SEATTLE, WA / SPRINGFIELD, VA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

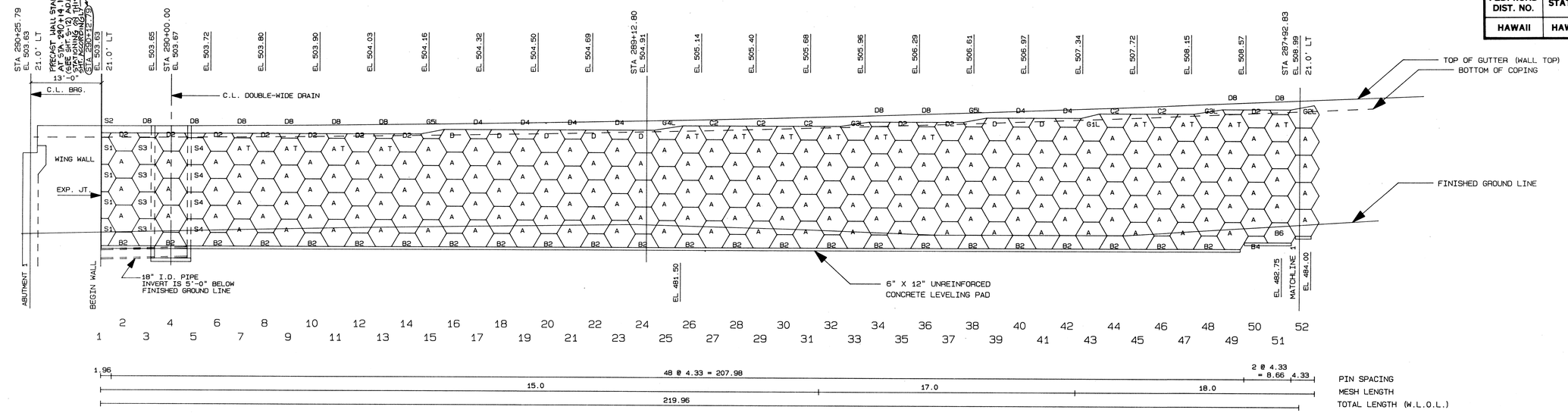
REINFORCED EARTH WALL
(ALTERNATE NO. 2)
NOTES AND DETAILS

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

SCALE: NO SCALE DATE: SEPT, 1991

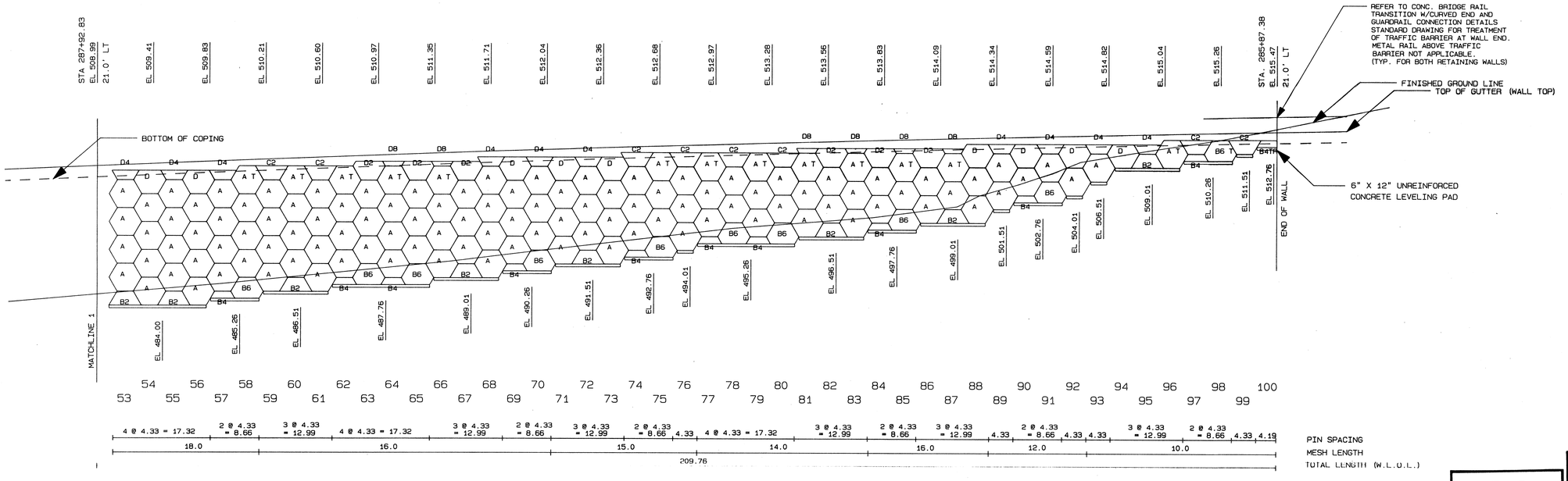
SHEET No. 1 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	66	75



ELEV. ABUTMENT NO. 1

SCALE: 1" = 10'-0"



NOTES:

1. ELEVATION ABOVE WALL IS TOP OF WALL ELEVATION.
2. ELEVATIONS BELOW WALL ARE TOP OF LEVELING PAD ELEVATION.
3. PIN SPACING IS MEASURED ALONG WALL L.O.L.

ELEV. ABUTMENT NO. 1

SCALE: 1" = 10'-0"

WALL DRAWN FRONT FACE

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

RETAINED EARTH™ WALLS
ABUTMENT NO. 1

STATE OF HAWAII D.O.T.
HOOLAWA BRIDGE REPLACEMENT
CONTRACT NO. FAIP-BR-RS-0360 (6)
CONTRACTOR:

1077 Dell Avenue
Campbell, California 95008
Telephone 408/866-5000
Telex: 910004324

VSL CORPORATION

ATLANTA, GA / CAMPBELL, CA / DALLAS-FORT WORTH, TX / DENVER, CO / HONOLULU, HI / HOUSTON, TX / KANSAS CITY, KS
LOS GATOS, CA (CORPORATE OFFICE) / LOS ANGELES, CA / MIAMI, FL / MINNEAPOLIS, MN / SEATTLE, WA / SPRINGFIELD, VA

RE-2
SHEET: ___ OF: ___

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

REINFORCED EARTH WALL
(ALTERNATE NO. 2)
ELEVATION

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)
SCALE: 1" = 10' DATE: SEPT., 1991

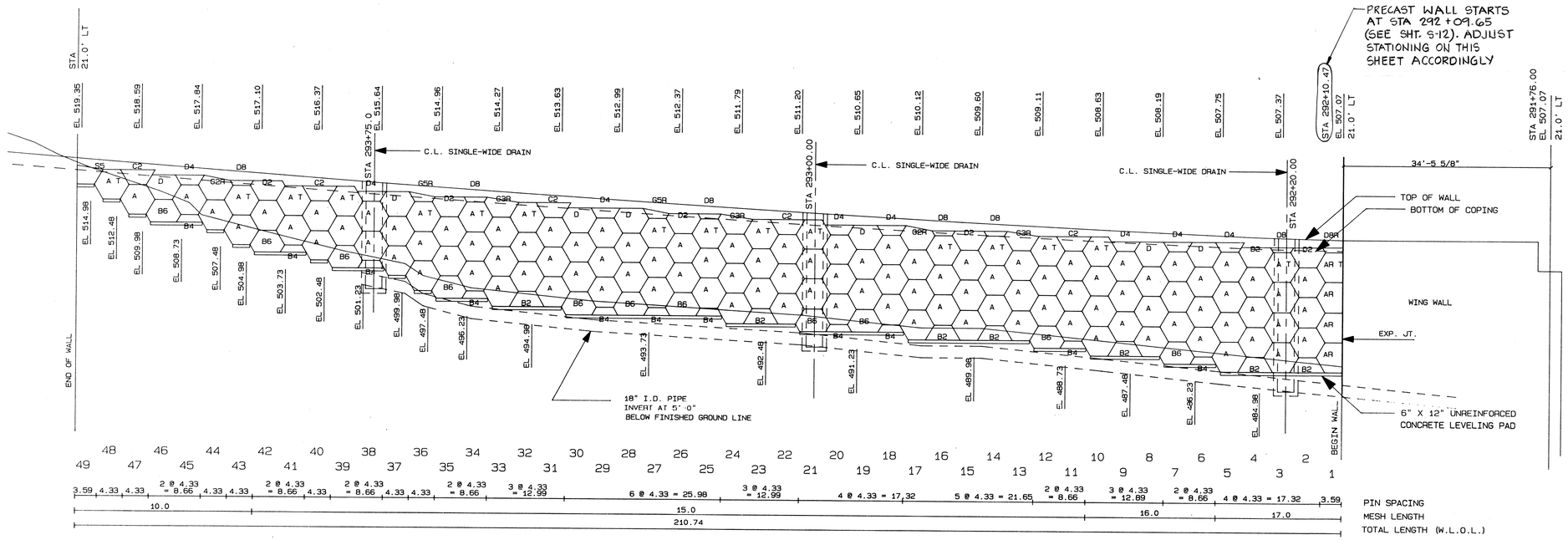
SHEET No. 2 OF 5 SHEETS

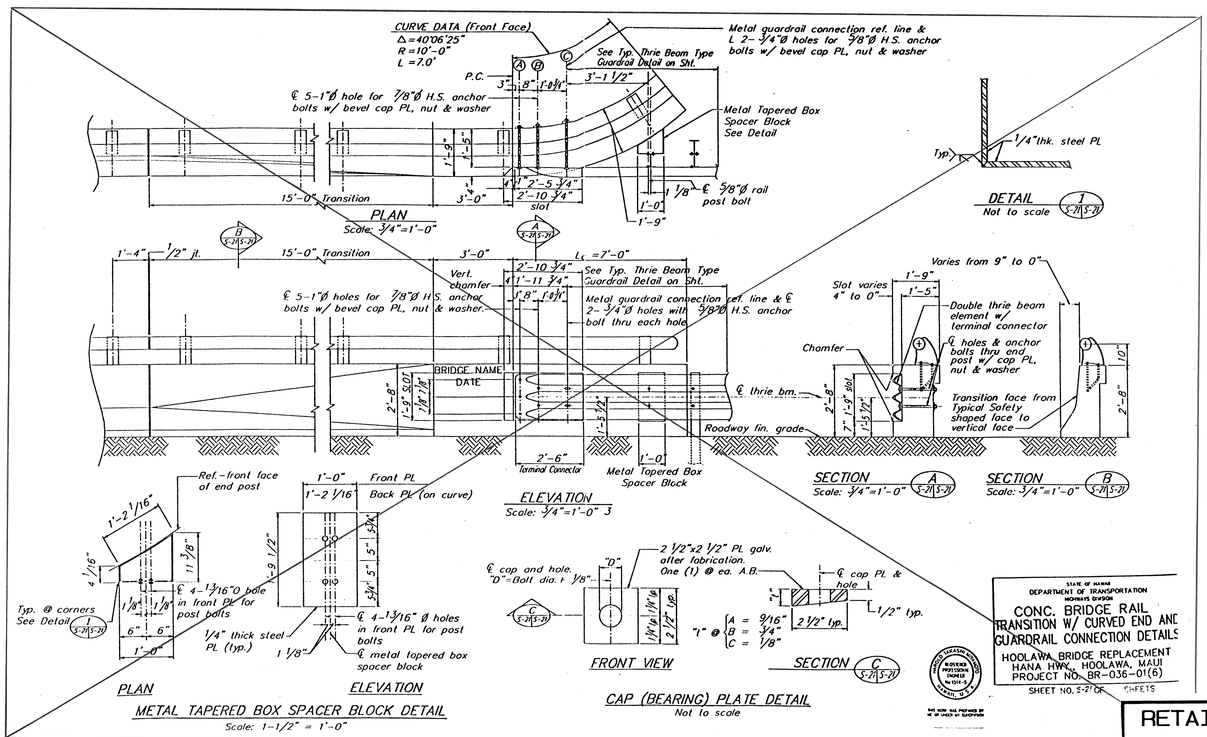
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	67	75

NOTES:

1. ELEVATION ABOVE WALL IS TOP OF WALL ELEVATION.
2. ELEVATIONS BELOW WALL ARE TOP OF LEVELING PAD ELEVATION.
3. PIN SPACING IS MEASURED ALONG WALL L.O.L.

WALL DRAWN FRONT FACE





ELEV. ABUTMENT NO. 2

SCALE: 1" = 10'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONC. BRIDGE RAIL TRANSITION W/ CURVED END AND GUARDRAIL CONNECTION DETAILS
HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-036-01(6)
SHEET NO. S-21 OF SHEETS

THE SEAL AND SIGNATURE APPEARING ON THIS SHEET WERE PREPARED BY ME OR UNDER MY SUPERVISION

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

RETAINED EARTH™ WALLS
ABUTMENT NO. 2

STATE OF HAWAII D.O.T.
HOOLAWA BRIDGE REPLACEMENT
FAIP-BR-RS-0360 (6)
CONTRACTOR:

1077 Dell Avenue
Campbell, California 95008
Telephone: 408/866-5000
Telex: 5101004324

VSL CORPORATION

ATLANTA, GA / CAMPBELL, CA / DALLAS-FORT WORTH, TX / DENVER, CO / HONOLULU, HI / HOUSTON, TX / KANSAS CITY, KS
LOS GATOS, CA (CORPORATE OFFICE) / LOS ANGELES, CA / MIAMI, FL / MINNEAPOLIS, MN / SEATTLE, WA / SPRINGFIELD, VA

RE-3
SHEET: ___ OF: ___

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

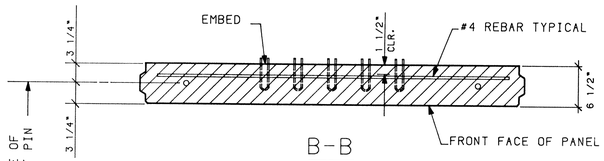
REINFORCED EARTH WALL
(ALTERNATE NO. 2)
ELEVATION AND DETAILS

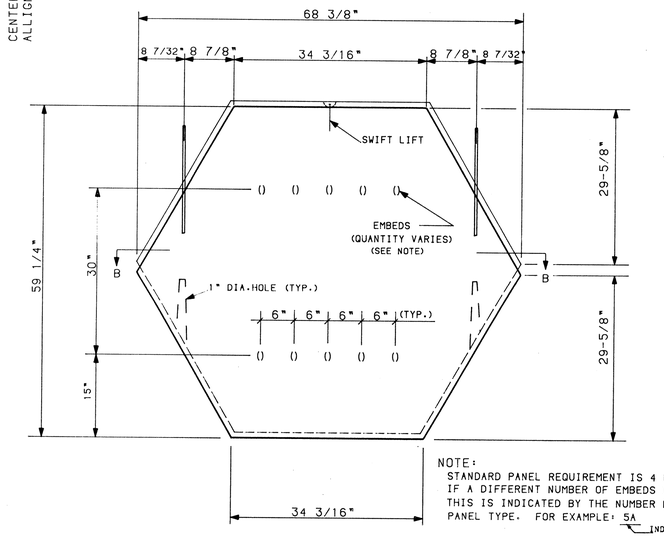
HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

SCALE: AS NOTED DATE: SEPT., 1991

SHEET No. 3 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	68	75

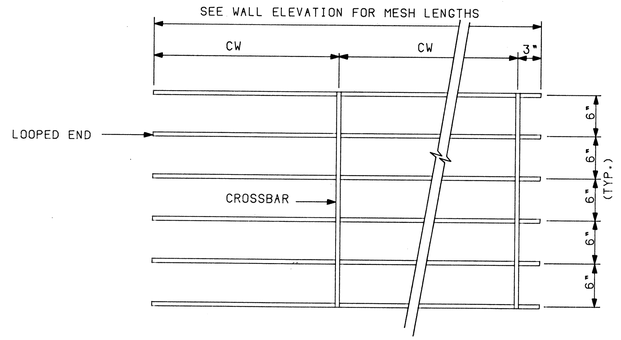




NOTE:
STANDARD PANEL REQUIREMENT IS 4 EMBEDS PER ROW. IF A DIFFERENT NUMBER OF EMBEDS IS REQUIRED THIS IS INDICATED BY THE NUMBER PRECEEDING THE PANEL TYPE. FOR EXAMPLE: 5A
INDICATES 5 EMBEDS PER ROW

TYPE "5A" PANEL

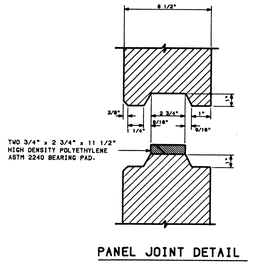
(FRONT FACE)



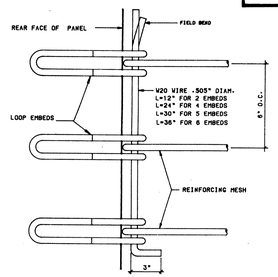
SOIL REINFORCING MESH UNIT DETAIL

NOTES:

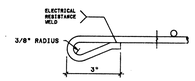
A. 6W11 MESH SHOWN, MESH CONFIGURATION VARIES. SEE WALL ELEVATIONS.
B. NUMBER OF EMBEDS VARIES ACCORDING TO MESH CONFIGURATIONS.



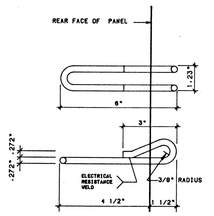
PANEL JOINT DETAIL



MESH CONNECTION



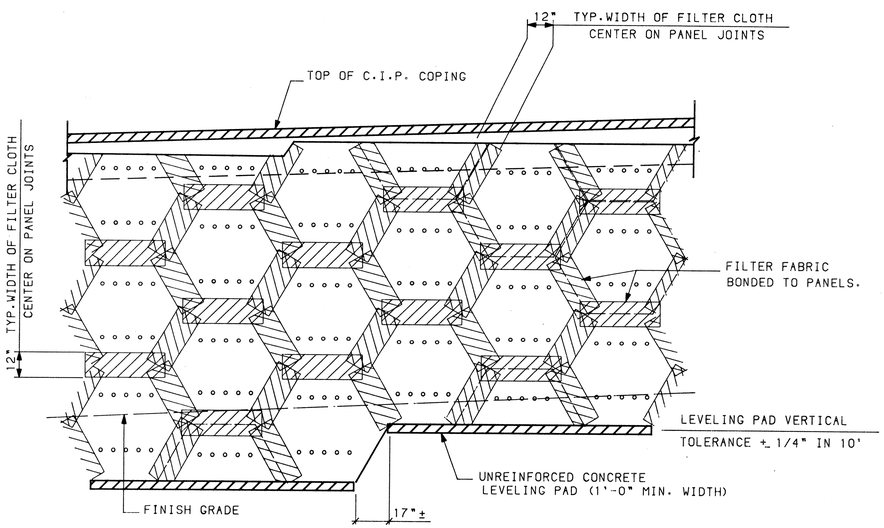
MESH LOOP



LOOP EMBED

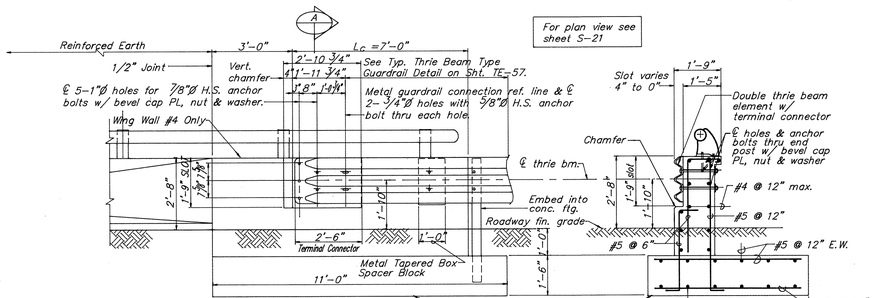
GENERAL NOTES:

1. PANEL REINFORCEMENT BARS SHALL BE DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT CONFORMING TO THE SPECIFICATIONS OF ASTM DESIGNATION A615, GRADE 60, INCLUDING SUPPLEMENTARY REQUIREMENT S1 OR LOW ALLOY STEEL DEFORMED BARS CONFORMING TO THE SPECIFICATIONS OF ASTM DESIGNATION A706.
2. W11 AND W20 STEEL WIRE SHALL CONFORM TO THE ASTM DESIGNATION A82. THE WELDED WIRE MAT. LOOP EMBED AND MESH LOOP SHALL BE WELDED IN ACCORDANCE WITH ASTM DESIGNATION A185.
3. ALIGNMENT PINS SHALL BE 5/8" DIAMETER STEEL CONFORMING TO ASTM DESIGNATION: A36.
4. MESH, EMBEDS, CONNECTOR BARS AND ALIGNMENT PINS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM DESIGNATION A123.
5. 28 DAY COMPRESSIVE STRENGTH OF PANEL CONCRETE EQUALS 4000 PSI.
6. OTHER MATERIALS NOT NOTED ABOVE SHALL CONFORM TO THE REQUIREMENTS IN "GENERAL SPECIFICATIONS FOR RETAINED EARTH WALLS" UNLESS OTHER REQUIREMENTS ARE INDICATED "SPECIAL PROVISIONS" FOR THE SPECIFIC PROJECT



PARTIAL WALL ELEVATION

(BACK FACE)



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

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

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTE BOOK
No.

RE-4
SHEET: ___ OF: ___

RETAINED EARTH ™ WALLS
STANDARD CONNECTION & PANEL JOINT DETAILS

STATE OF HAWAII D.O.T.
HOOLAWA BRIDGE REPLACEMENT
PROJECT: FAIP-BR-RS-0360(6)
CONTRACTOR:

1077 Dell Avenue
Campbell, California 95008
Telephone: 408/866-5000
Telex: 5101004324

VSL CORPORATION

ATLANTA, GA / CAMPBELL, CA / DALLAS-FORT WORTH, TX / DENVER, CO / HONOLULU, HI / HOUSTON, TX / KANSAS CITY, KS
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

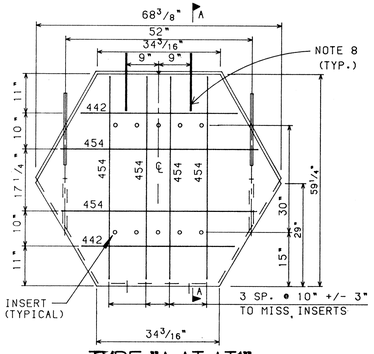
REINFORCED EARTH WALL (ALTERNATE NO. 2) DETAILS

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

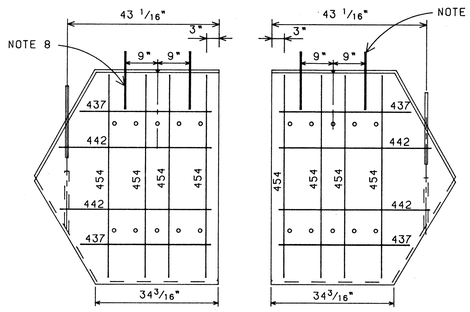
SCALE: NO SCALE
DATE: SEPT., 1991

SHEET No. 4 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-RS-0360(6)	1992	69	75

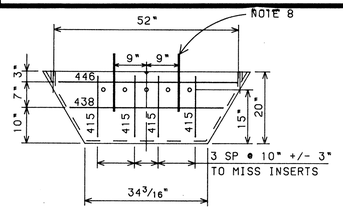


TYPE "A,AT,AT1"

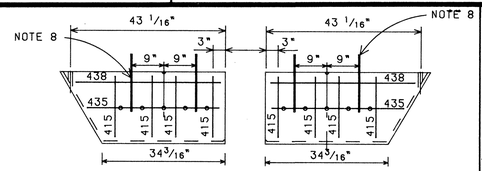


FOR DIMENSIONS NOT SHOWN SEE TYPE "A"

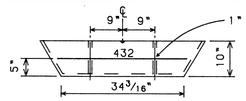
TYPE "AL,ALT" TYPE "AR,ART"



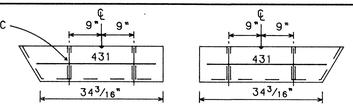
TYPE "D4,D4T"



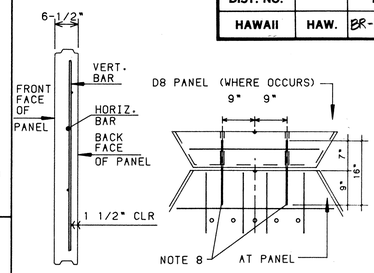
TYPE "D4L,D4LT" TYPE "D4R,D4RT"



TYPE "D8"

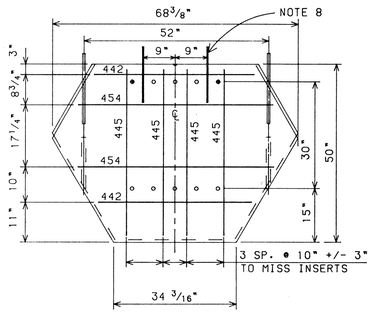


TYPE "D8L" TYPE "D8R"

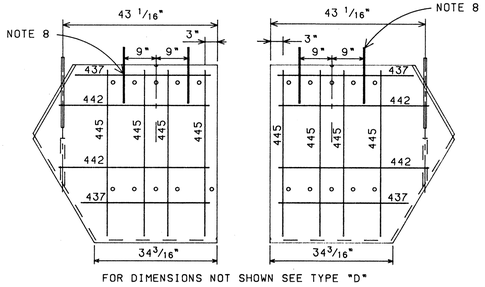


SECTION A-A TYPE "AT"

(SIMILAR FOR RIGHT AND LEFT END PANELS OF THESE TYPES)

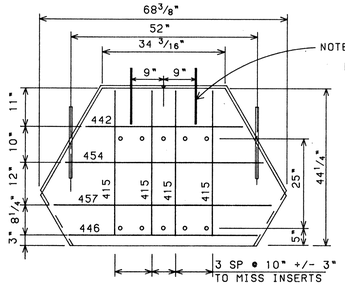


TYPE "D,DT"

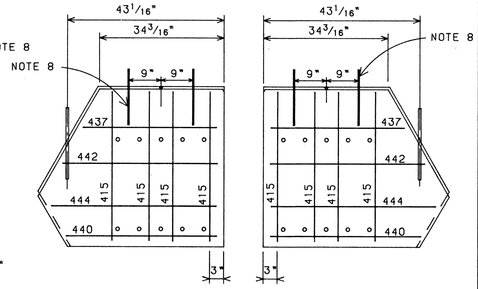


FOR DIMENSIONS NOT SHOWN SEE TYPE "D"

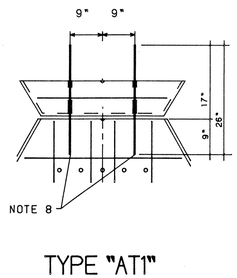
TYPE "DL,DLT" TYPE "DR,DRT"



TYPE "B6,B6T"

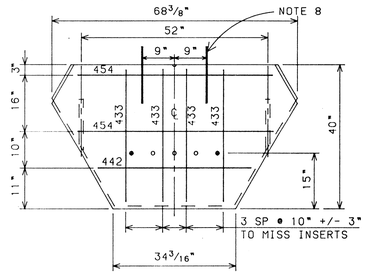


TYPE "B6L,B6LT" TYPE "B6R,B6RT"

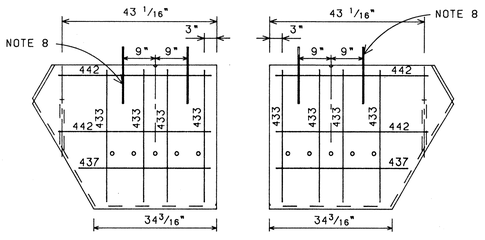


TYPE "AT1"

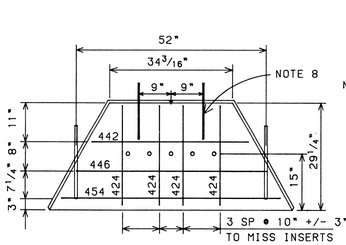
(SIMILAR FOR RIGHT AND LEFT END PANELS OF THESE TYPES)



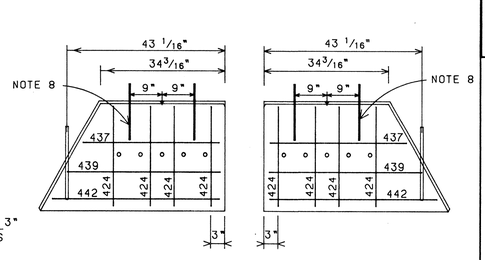
TYPE "D2,D2T"



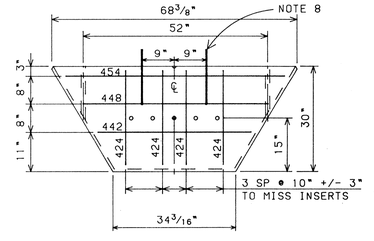
TYPE "D2L,D2LT" TYPE "D2R,D2RT"



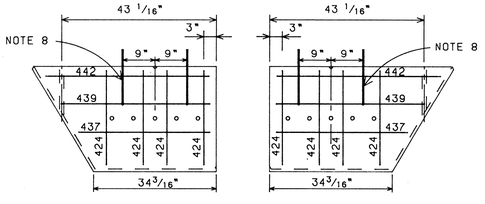
TYPE "B2,B2T"



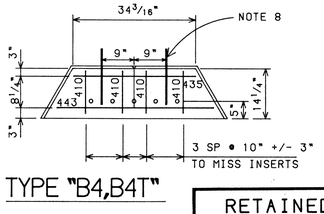
TYPE "B2L,B2LT" TYPE "B2R,B2RT"



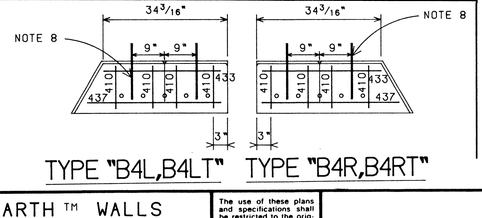
TYPE "C2,C2T"



TYPE "C2L,C2LT" TYPE "C2R,C2RT"



TYPE "B4,B4T"



TYPE "B4L,B4LT" TYPE "B4R,B4RT"

PANEL REINFORCING (BACK FACE)

FOR MESH DENSITIES OF 4W11, 5W11, 6W11, 4W20.

NOTES:

1. ALL REINFORCING STEEL TO BE #4 BARS.
2. ALL REINFORCING STEEL TO BE GRADE 60.
3. DIMENSIONS SHOWN ARE TO THE FRONT FACE UNLESS NOTED OTHERWISE.
4. VERTICAL BARS TO HAVE 1 1/2" CLEAR TO THE BACK FACE OF PANEL.
5. ALL BARS TO HAVE 1 1/2" CLEAR TO THE SIDES OF PANEL.
6. LEFT END PANELS ARE OPPOSITE OF RIGHT END PANELS.
7. ALL SPACES BETWEEN BARS MAY VARY +/- 3" TO AVOID EMBEDS AND MAINTAIN CLEARANCES.
8. #4 BAR FOR ALL PANELS WITH THE "T" SUBFIX.
9. REINFORCEMENT LABELS INDICATE BAR SIZE AND LENGTH. EXAMPLE: 454 IS A #4 BAR 54" LONG.

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

RE-5
SHEET: ___ OF: ___

RETAINED EARTH ™ WALLS
PANEL REBAR DETAILS

STATE OF HAWAII D.O.T.
PROJECT HOOLAWA BRIDGE REPLACEMENT
CONTRACT NO. FAIP-BR-RS-0360(6)
CONTRACTOR

1077 Dell Avenue
Campbell, California 95008
Telephone: 408/866-5000
Telex: 5101004324

VSL CORPORATION

ATLANTA, GA / CAMPBELL, CA / DALLAS-FORT WORTH, TX / DENVER, CO / HONOLULU, HI / HOUSTON, TX / KANSAS CITY, KS
LOS GATOS, CA (CORPORATE OFFICE) / LOS ANGELES, CA / MIAMI, FL / MINNEAPOLIS, MN / SEATTLE, WA / SPRINGFIELD, VA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

REINFORCED EARTH WALL
(ALTERNATE NO. 2)
DETAILS

HOOLAWA BRIDGE REPLACEMENT
HANA HWY., HOOLAWA, MAUI
PROJECT NO. BR-RS-0360(6)

SCALE: NO SCALE DATE: SEPT., 1991

SHEET No. 5 OF 5 SHEETS