

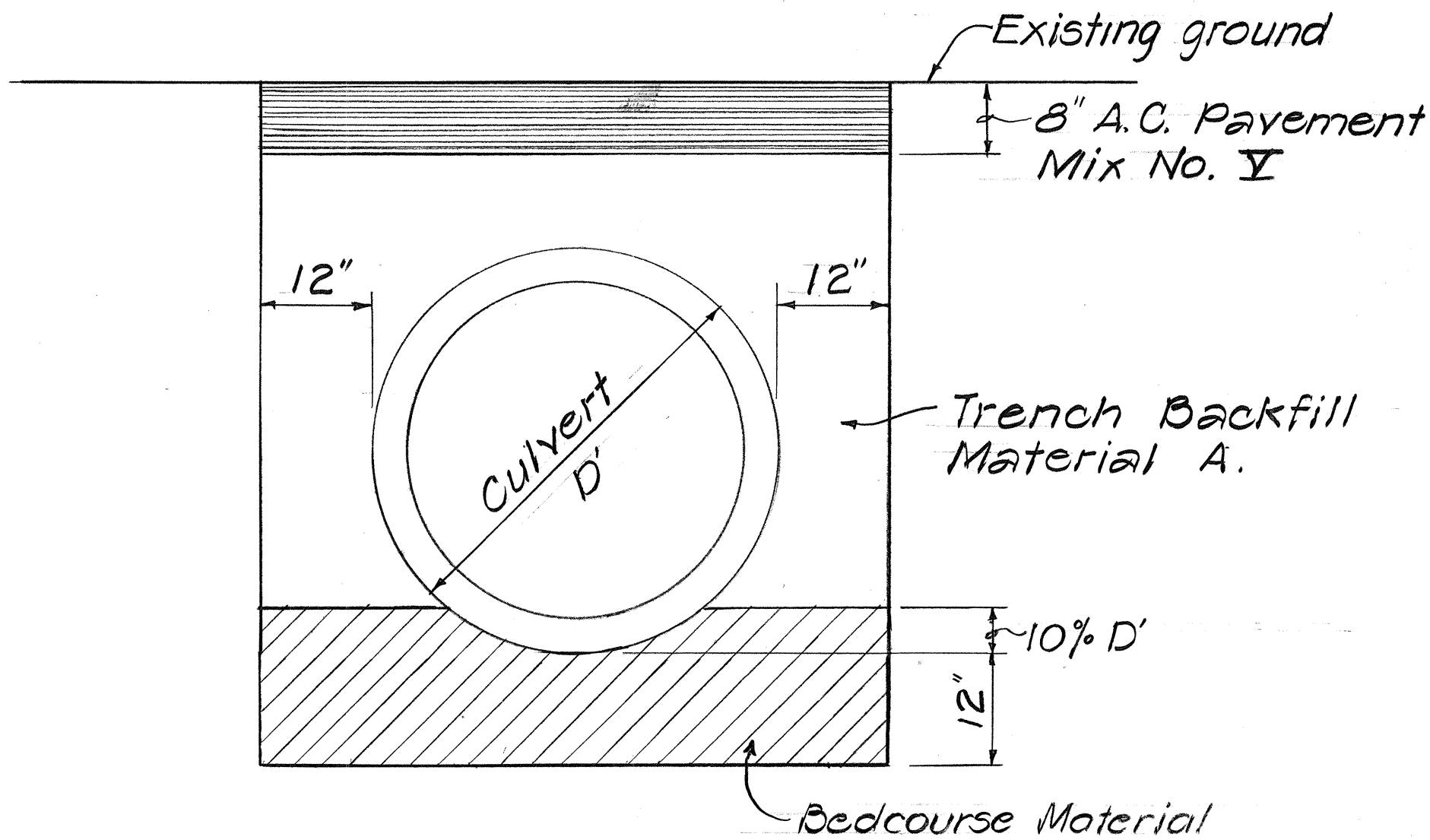
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-84	1984	7	29

CULVERT REPLACEMENT TABLE

STATION	DRAINAGE STRUCTURES	DETAIL PLAN SHT. NO.
900+09	24" RCP Cl. III Standard CRM Headwall 2 ea.	8
910+71	30" CMP, Sht. "t"= 0.079 Standard CRM Headwall 1 ea. Type A CRM Headwall 1 ea. Coupling Band 1 ea.	8
915+80	36" RCP Cl. III Type A CRM Headwall 12 ea. Standard CRM Headwall 1 ea.	9
923+33	24" RCP Cl. III Type A CRM Headwall 2 ea.	9
924+98	48" CMP Cl. A Concrete Lining GRP Apron 1 ea.	10

GENERAL NOTES:

- Inverts shall be same as existing, as shown on plans or as directed by the Engineer.
- Culvert alignment shall be same as existing or as directed by the Engineer.
- Top Elevation of the Type A CRM Headwall shall conform to existing drywall, as shown on plans, or as directed by Engineer.
- The entrance and outlet condition of the culvert shall be graded to the satisfaction of the Engineer. Above work shall be considered incidental to the various contract items.
- Demolishing and removal of existing culverts and structures shall not be paid for separately but shall be considered incidental to the various contract items.



TRENCH DETAIL FOR CULVERTS
Scale: 3/4" = 1'- 0"

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

LAND TRANSPORTATION FACILITIES DIVISION

DRAINAGE DETAILS

CULVERT REPLACEMENT TABLE,

GENERAL NOTES & TRENCH DETAIL

HANA HIGHWAY IMPROVEMENTS

HONOMANU TOWARDS HANA

PROJ. NO. 360AB-01-84

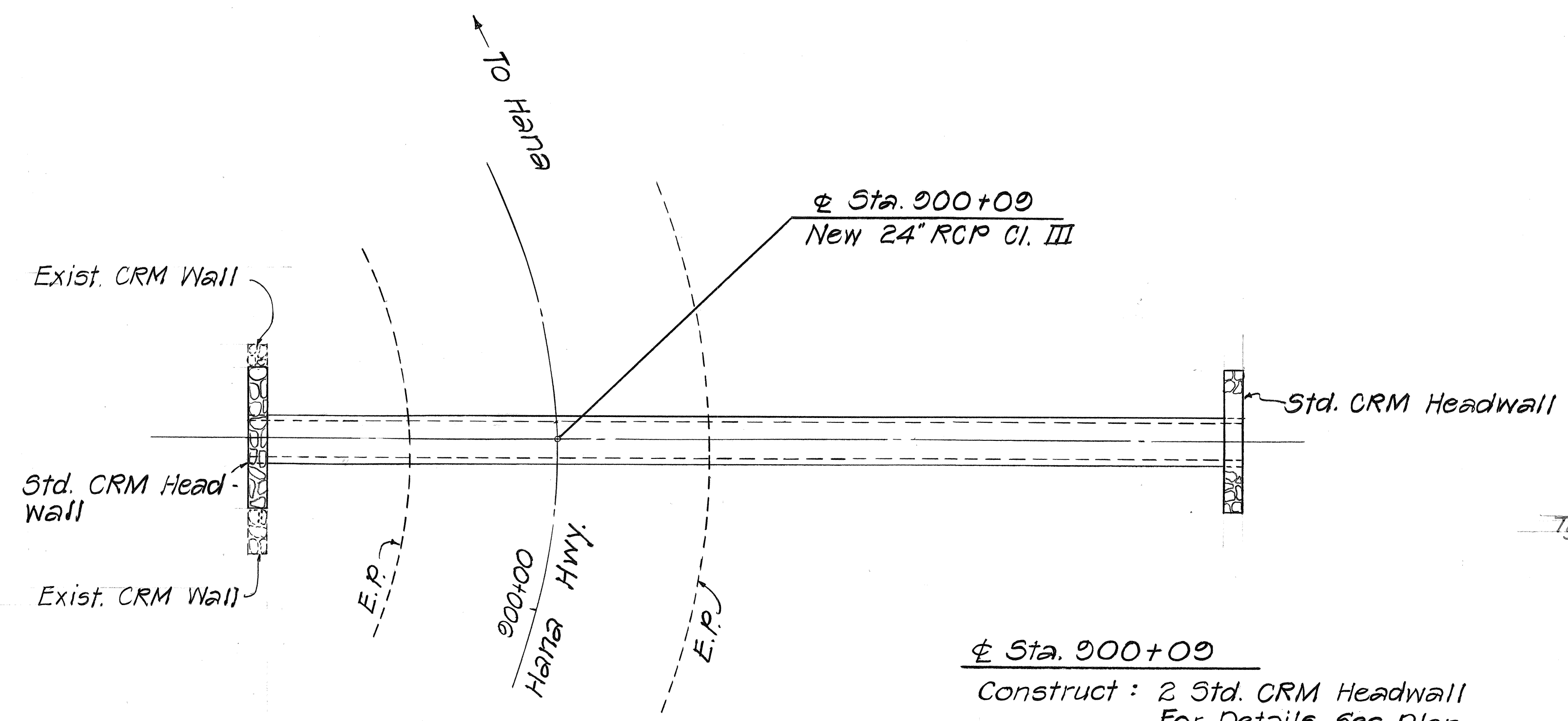
SCALE: AS SHOWN

JUNE 1983

SHEET NO. 1 OF 7 SHEETS

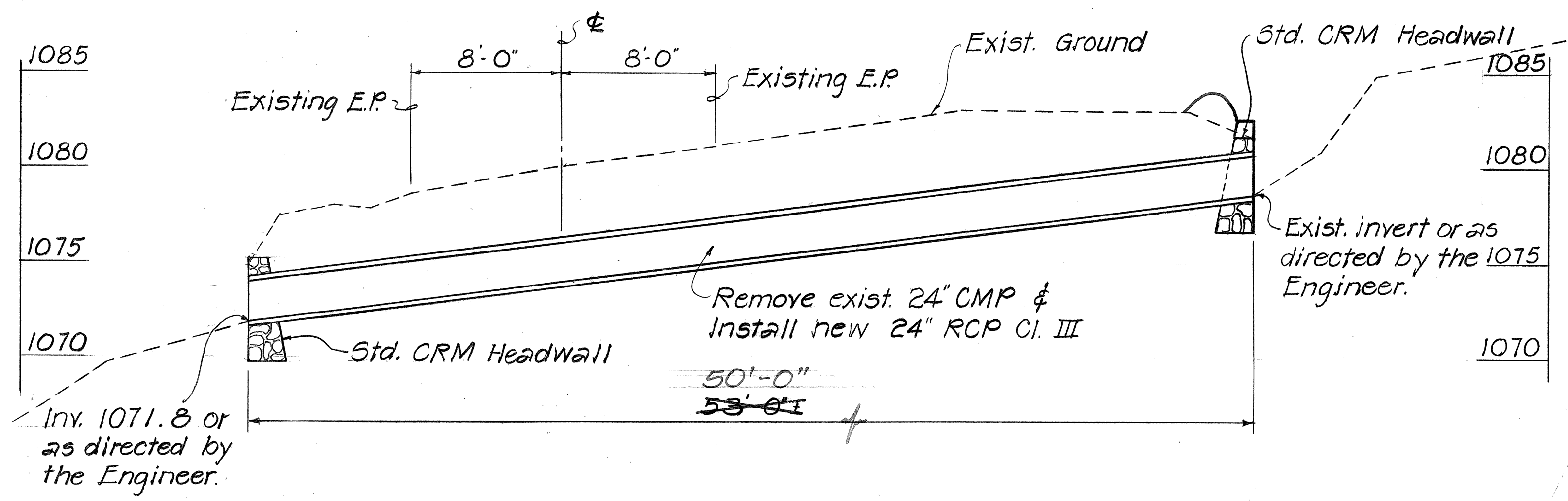
ORIGINAL PLAN	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	
QUANTITIES BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	
QUANTITIES BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-84	1984	8	29

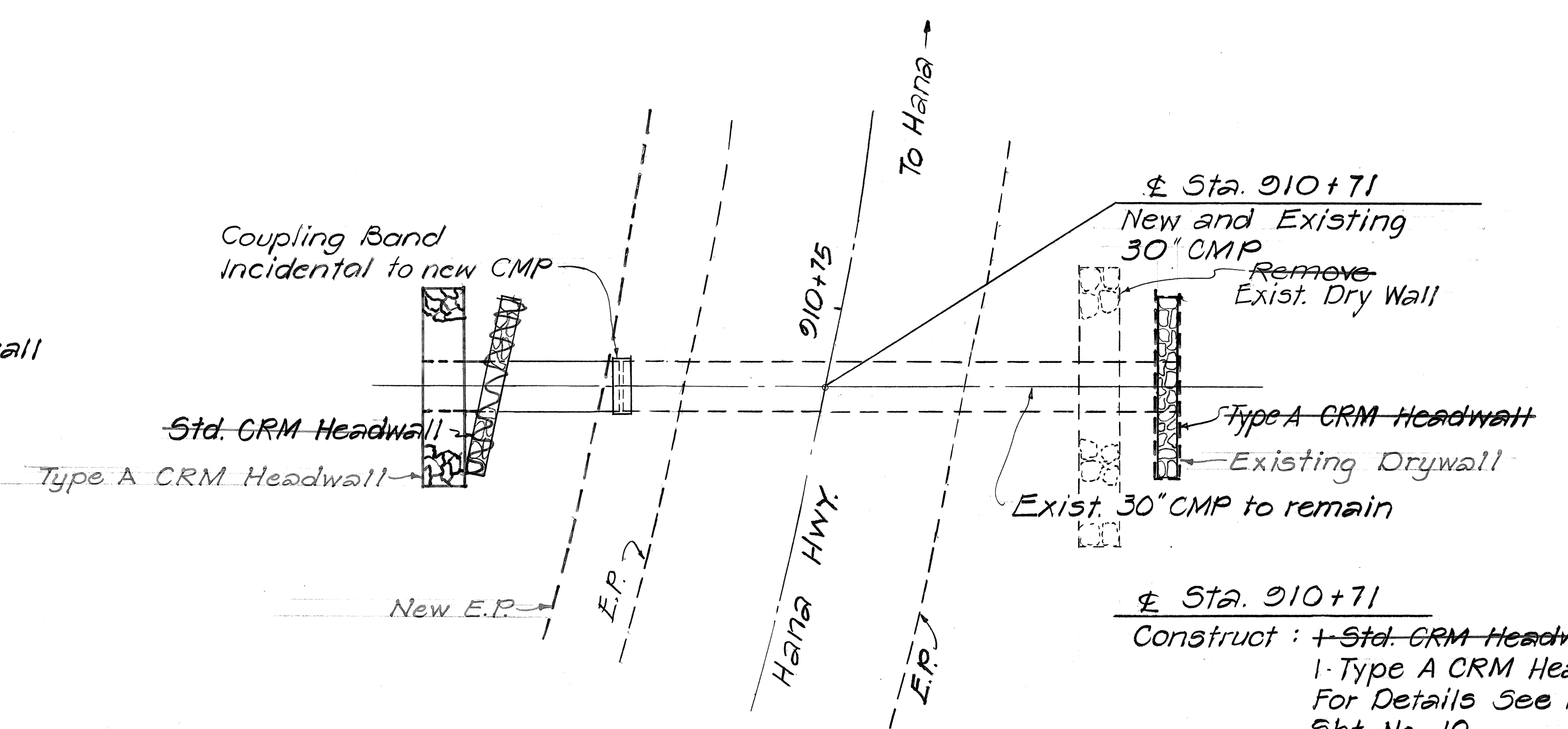


PLAN
Scale: 1"=5'-0"

± Sta. 900+09
Construct : 2 Std. CRM Headwall
For Details See Plan
Sheet No. 12
Install : 24" RCP Cl. III
Remove : 24" CMP - 53'±
ESTIMATED QUANTITIES
Struc. Exc. --- 64.67 c.y.
CRM --- 4 c.y.
24" RCP Cl. III --- 50.54' L.F.
Bedcourse --- 8.10 c.y.



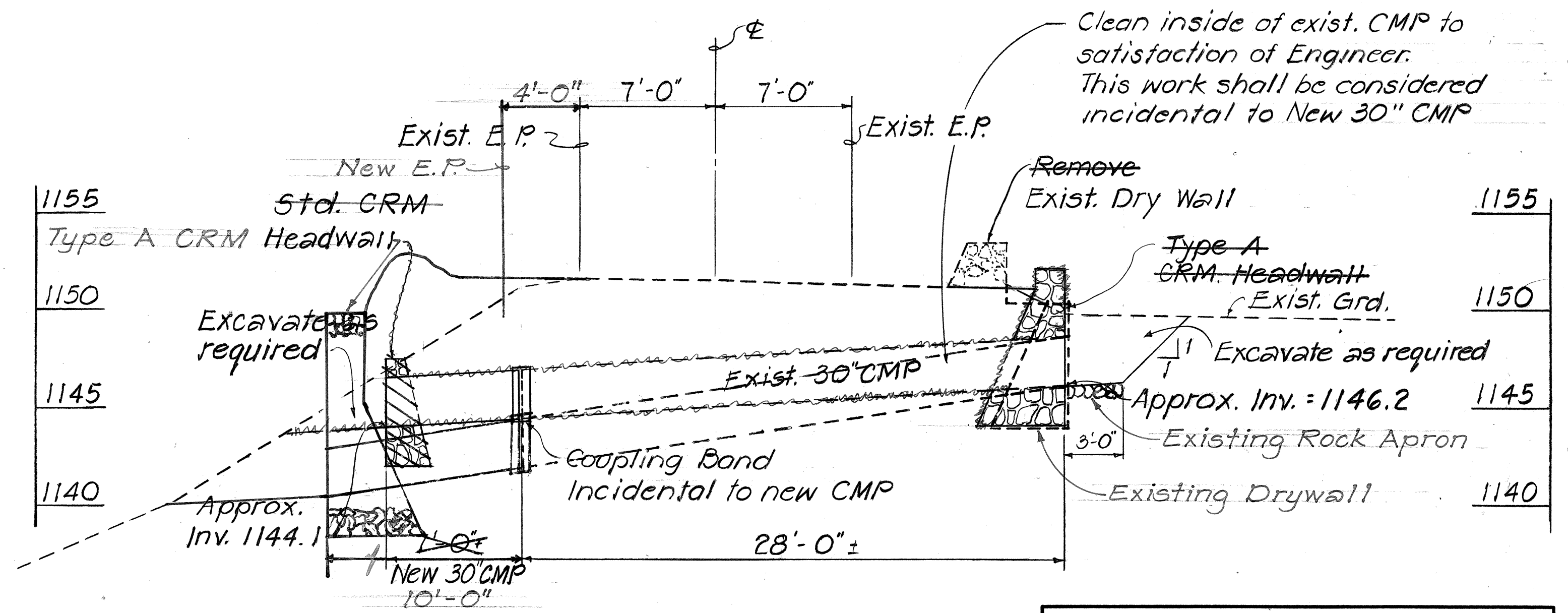
± PROFILE - STA. 900+09
Scale: 1"=5'-0"



PLAN
Scale: 1"=5'-0"

± Sta. 910+71
Construct : 1 Std. CRM Headwall
1 Type A CRM Headwall
For Details See Plan
Sht. No. 10
Install : 30" CMP, Sht. "t" = 0.079"
ESTIMATED QUANTITIES
Struc. Exc. --- 21.41 c.y.
CRM --- 11.10 c.y.
30" CMP --- 10.81 f.
Bedcourse --- 1 c.y.

NOTE:
Inlet is assumed to be at 18' Rt
of ± and outlet at 10' Lt. of ±.
Contractor to verify locations in the field

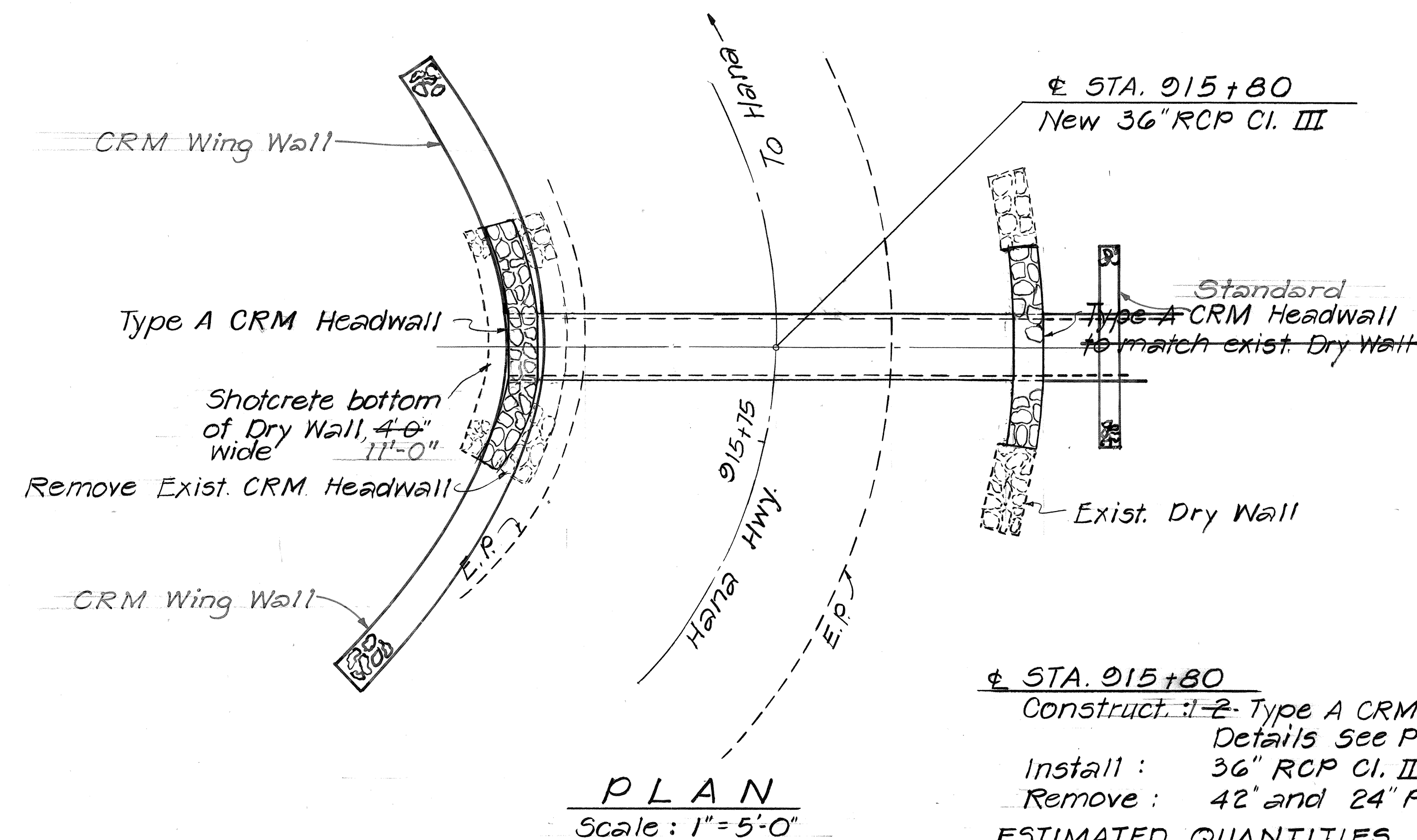


± PROFILE - STA. 910+71
Scale: 1"=5'-0"

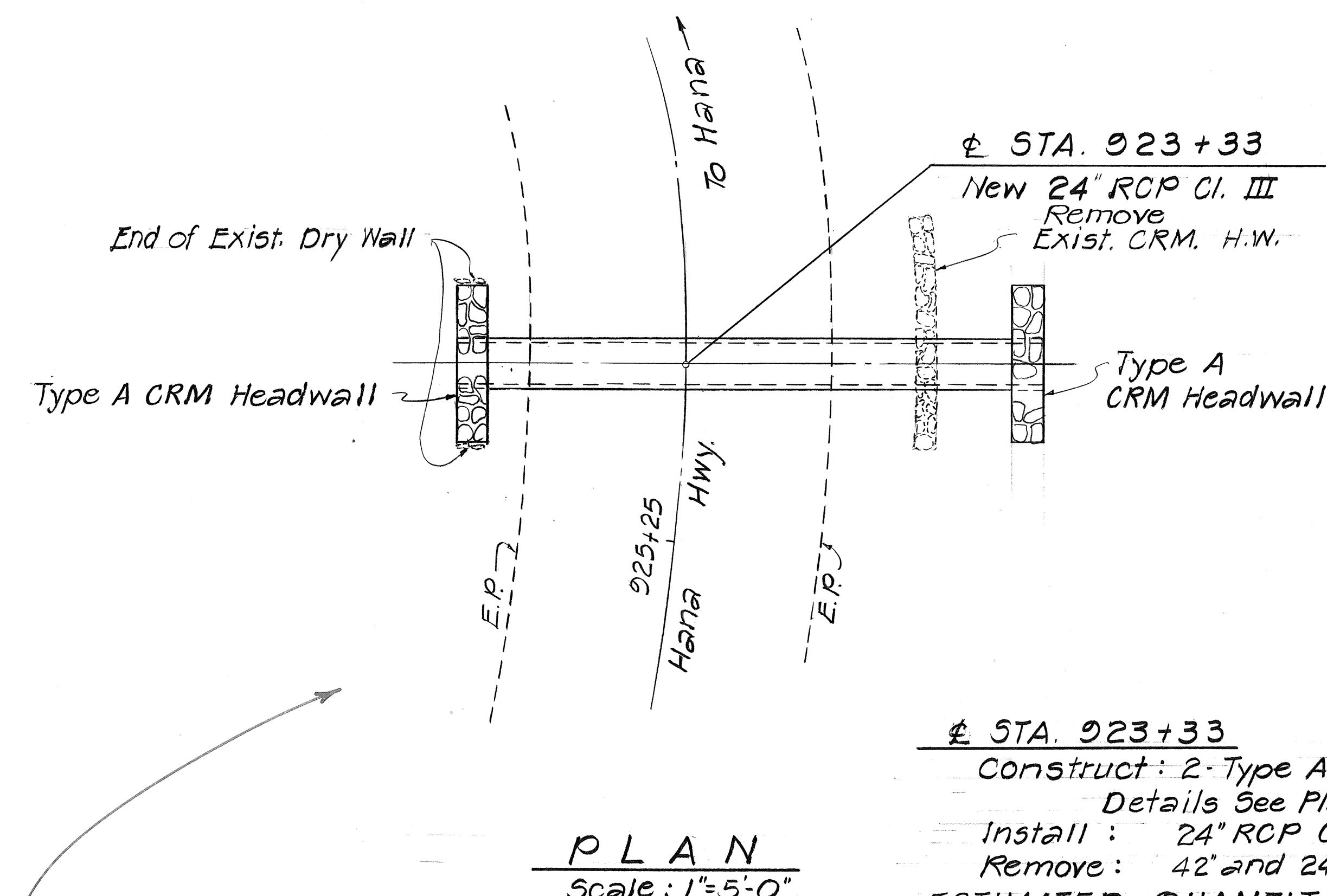
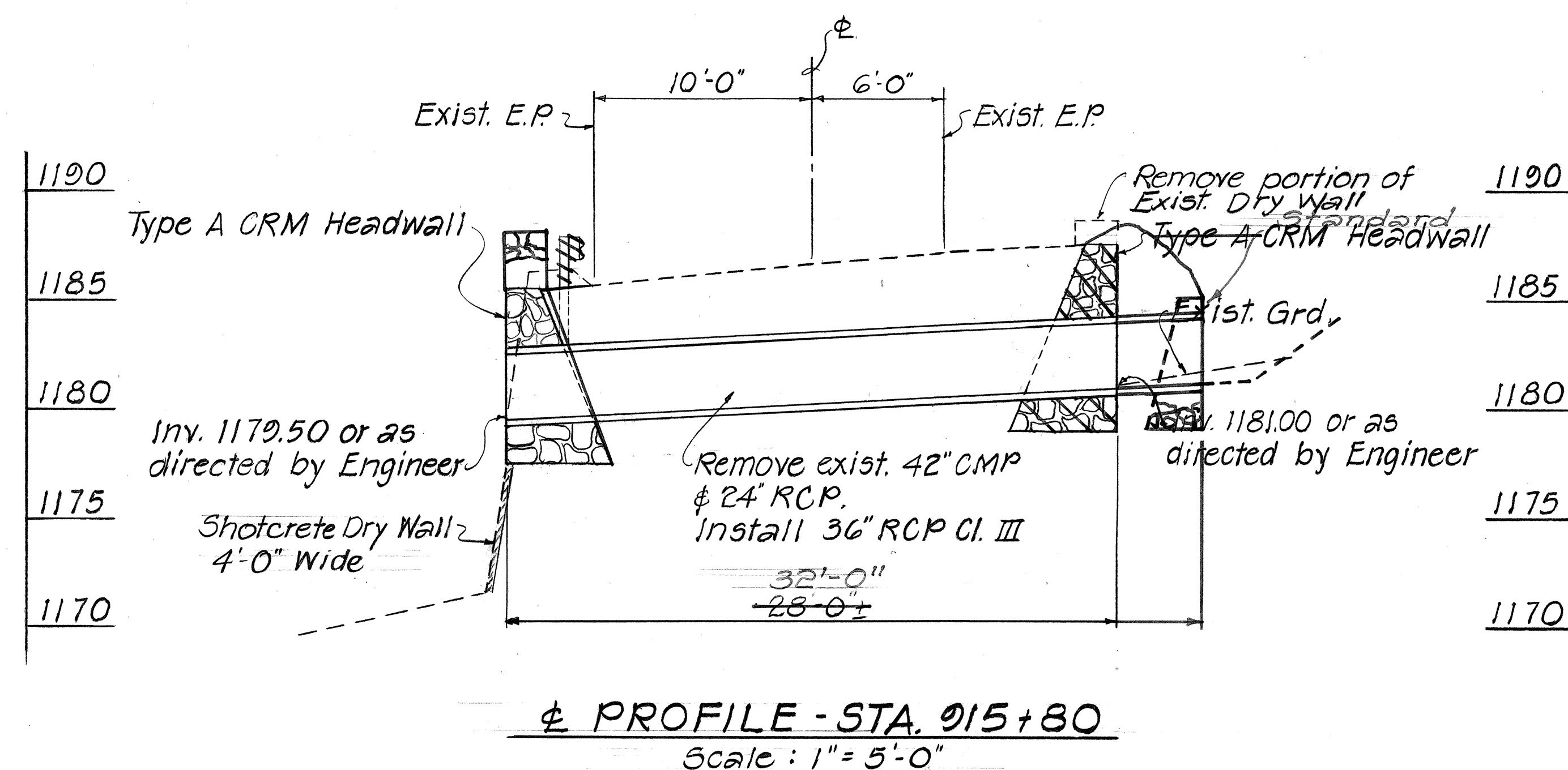
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
PLAN AND PROFILE FOR
CULVERTS AT STA. 900+09 AND 910+71
HANA HIGHWAY IMPROVEMENTS
HONOLULU TOWARDS HANA
PROJ. NO. 360AB-01-84
SCALE: AS NOTED JUNE 1983
SHEET NO. 2 OF 7 SHEETS

ORIGINAL	DATE
PLAN	
DESIGNED BY	
NOTED BY	
CHECKED BY	
NO.	

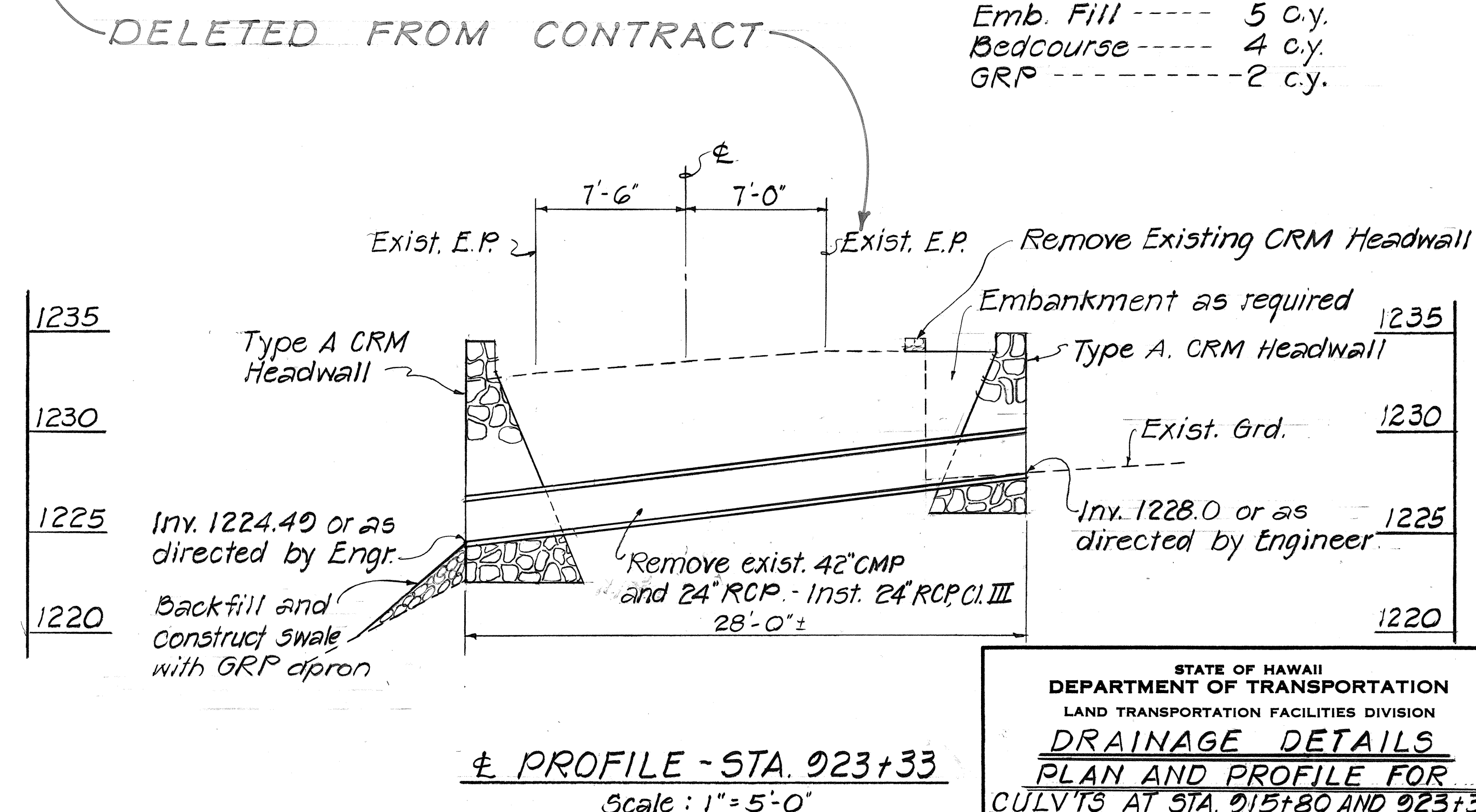
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-84	1984	9	29



± STA. 015+80
Construct: 1-2 Type A CRM Headwall, for Details See Plan Sht. No. 10
Install: 36" RCP Cl. III
Remove: 42" and 24" Pipes
ESTIMATED QUANTITIES
Struc. Exc. ----- 84.72 c.y.
CRM ----- 27.10 c.y.
36" RCP Class III ----- 32.28 l.f.
Bedcourse ----- 5 c.y.

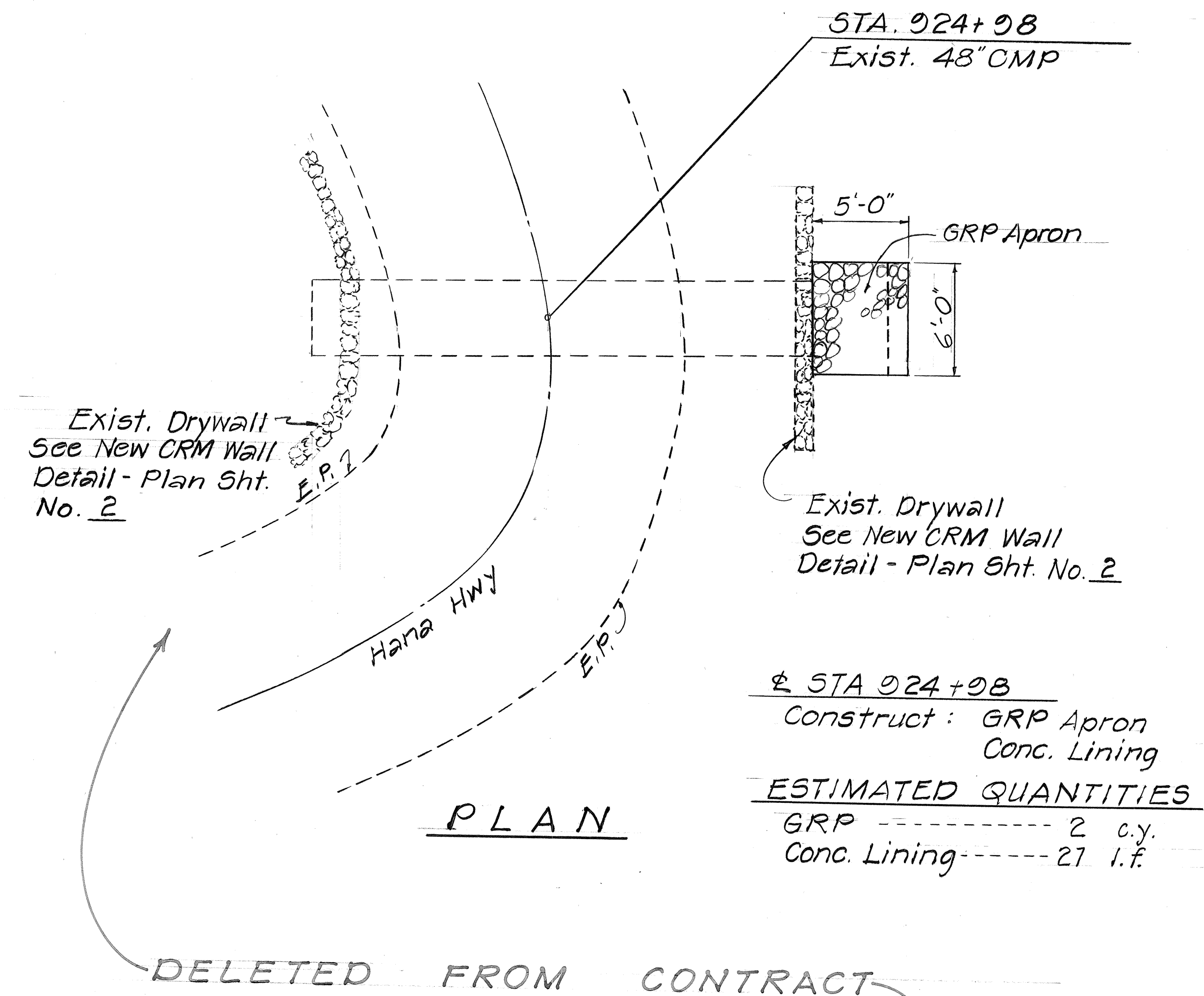


± STA. 023+33
Construct: 2 Type A CRM H.W., for Details See Plan Sht. No. 10
Install: 24" RCP Cl. III
Remove: 42" and 24" Pipes
ESTIMATED QUANTITIES
Struc. Exc. ----- 52 c.y.
CRM ----- 18 c.y.
24" RCP Cl. III ----- 20 l.f.
Emb. Fill ----- 5 c.y.
Bedcourse ----- 4 c.y.
GRP ----- 2 c.y.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
PLAN AND PROFILE FOR
CULVERTS AT STA. 015+80 AND 023+33
HANA HIGHWAY IMPROVEMENTS
HONOLULU TOWARDS HANA
PROJ. NO. 360AB-01-84
SCALE: AS NOTED JUNE 1983
SHEET NO. 3 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-84	1984	10	29



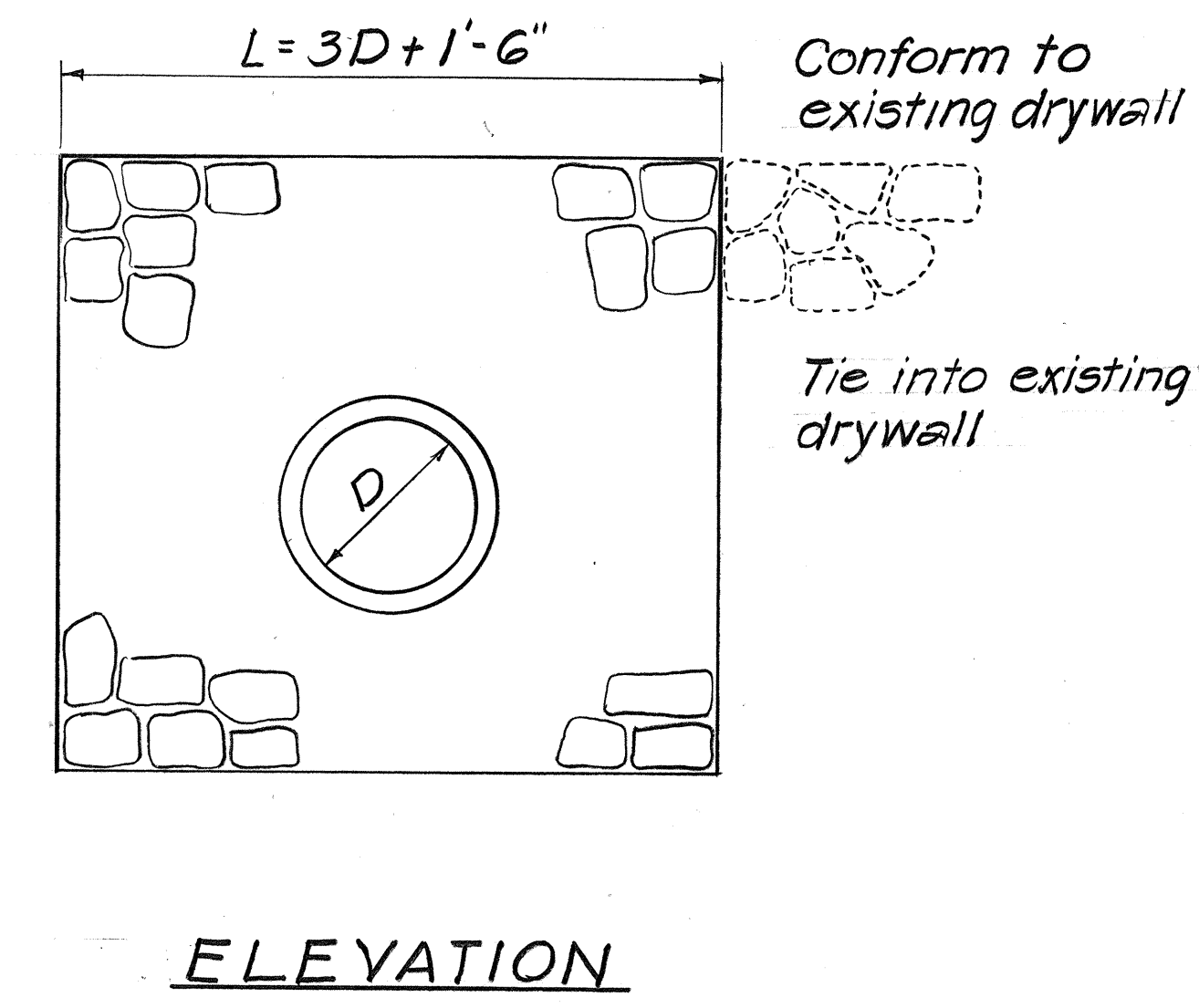
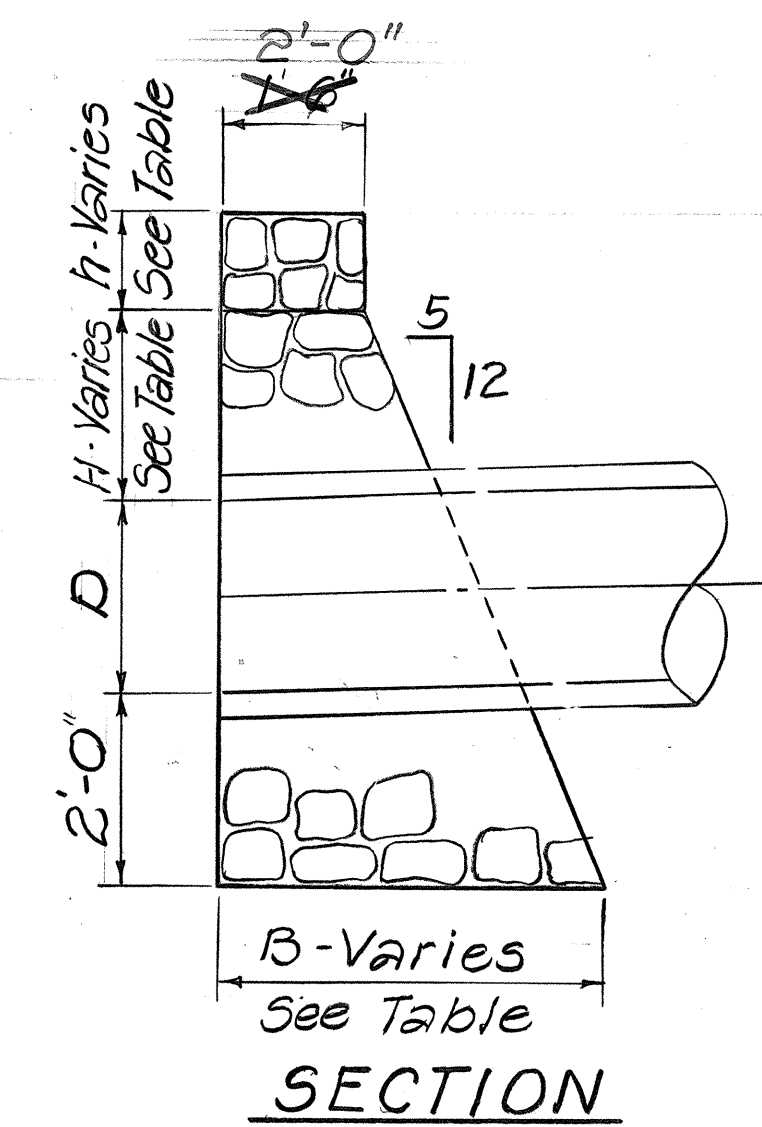
± STA 924+08

Construct:	GRP Apron
	Conc. Lining

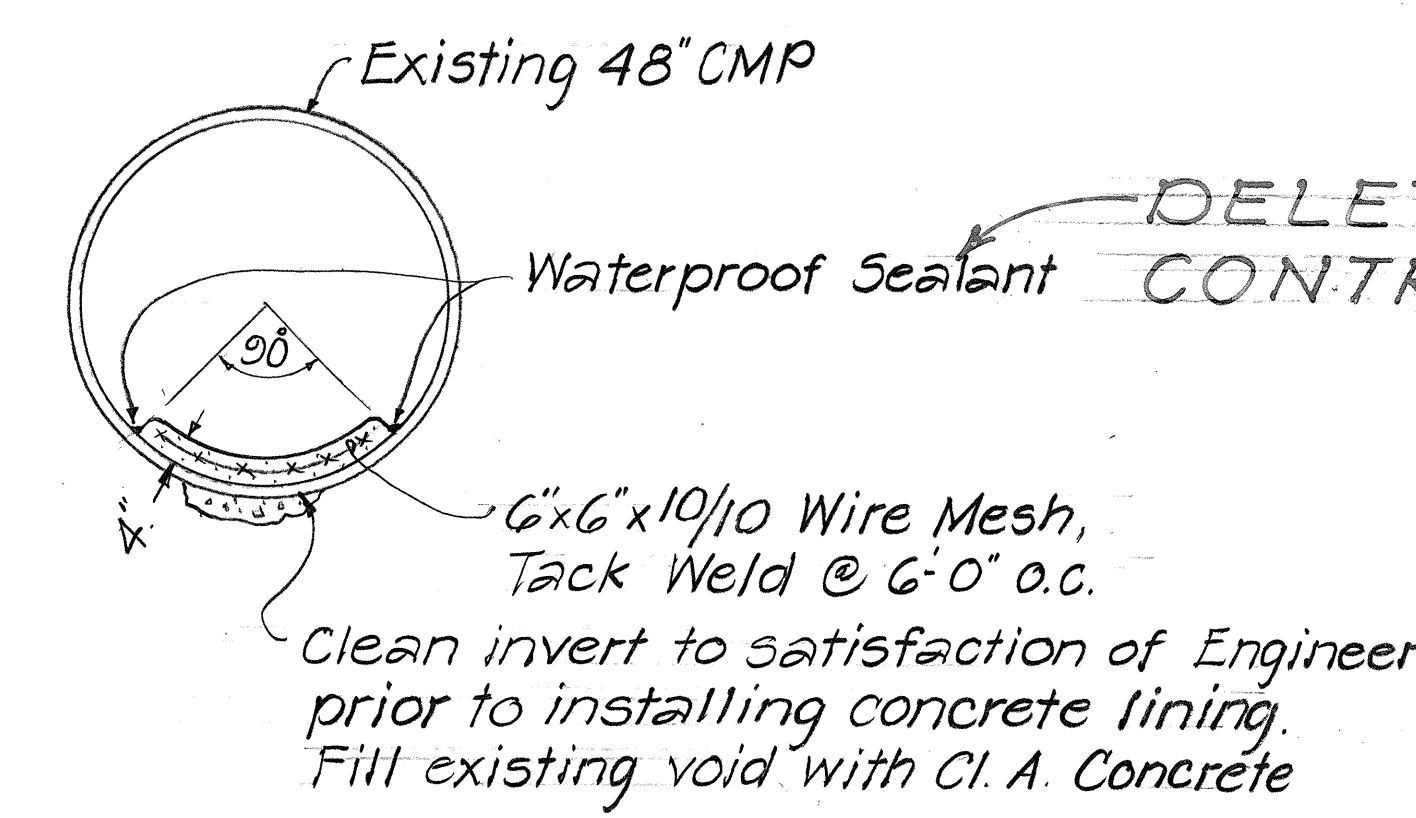
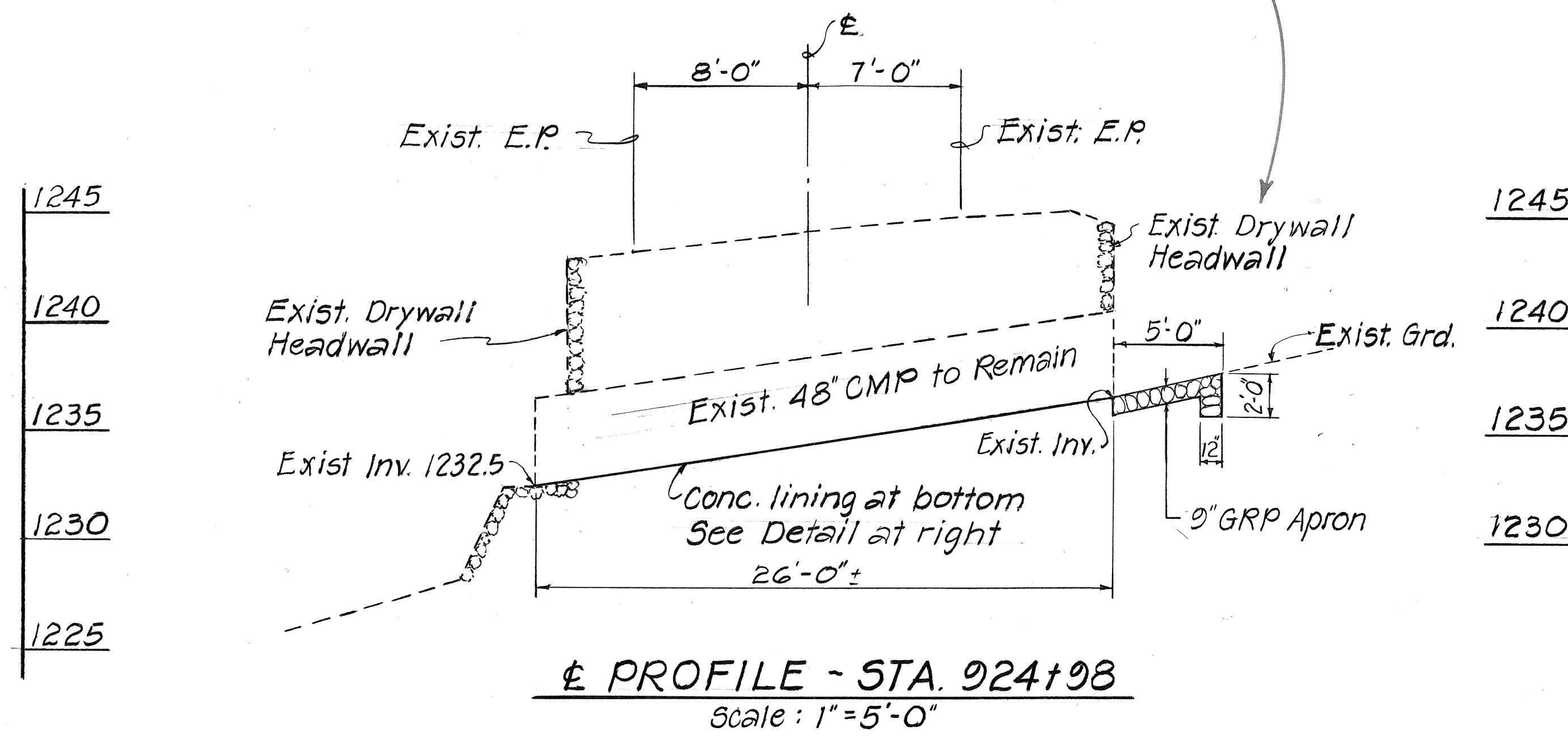
ESTIMATED QUANTITIES

GRP	2 c.y.
Conc. Lining	27 l.f.

STA	B	H	h	L
910+71R	4'-6"	2'-6"	1'-0"	9'-0"
915+80R	5'-0"	3'-6"	0	10'-6"
915+80L	5'-0"	3'-0"	0	10'-6"
923+33R	5'-0"	4'-0"	1'-0"	7'-6"
923+33L	6'-0"	6'-6"	1'-6"	7'-6"



DETAIL OF TYPE A CRM HEADWALL
Scale: 1/2" = 1'-0"



DELETED FROM CONTRACT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

DRAINAGE DETAILS

PLAN AND PROFILE @ STA. 924+08
AND TYPICAL DETAILS

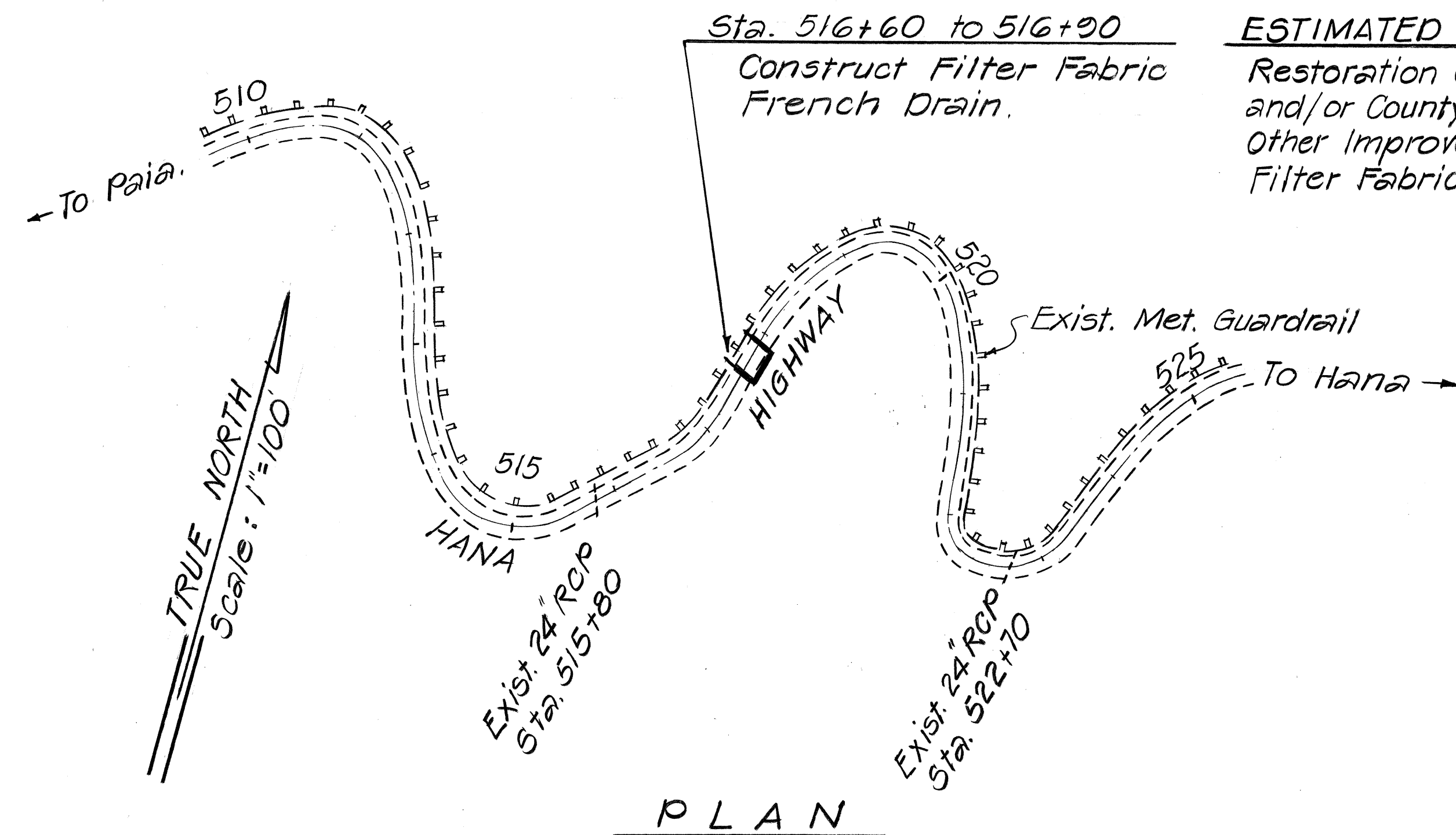
HANA HIGHWAY IMPROVEMENTS
HONOMANU TOWARDS HANA
PROJ. NO. 360AB-01-84

Scale: As Noted June 1983

SHEET NO. 4 OF 7 SHEETS

DATE	BY
1245	1240
1235	1230
1225	

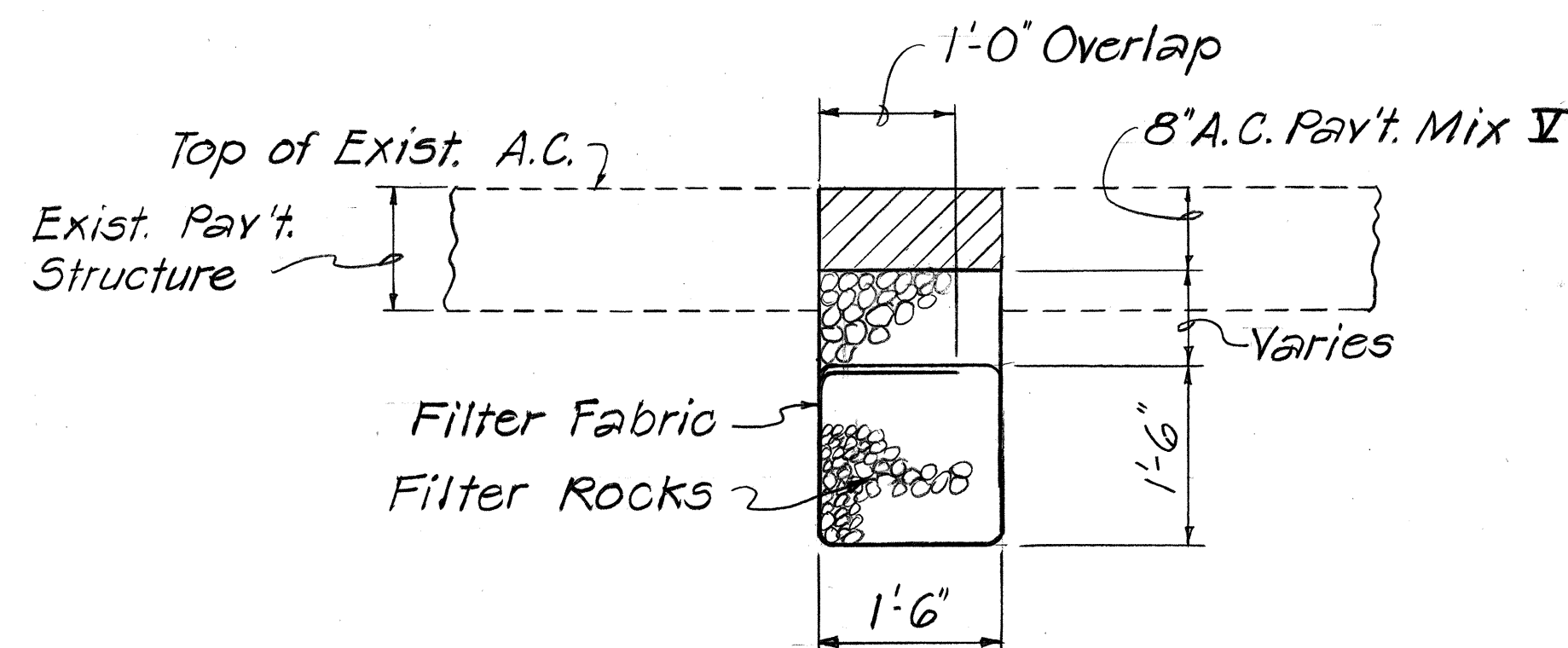
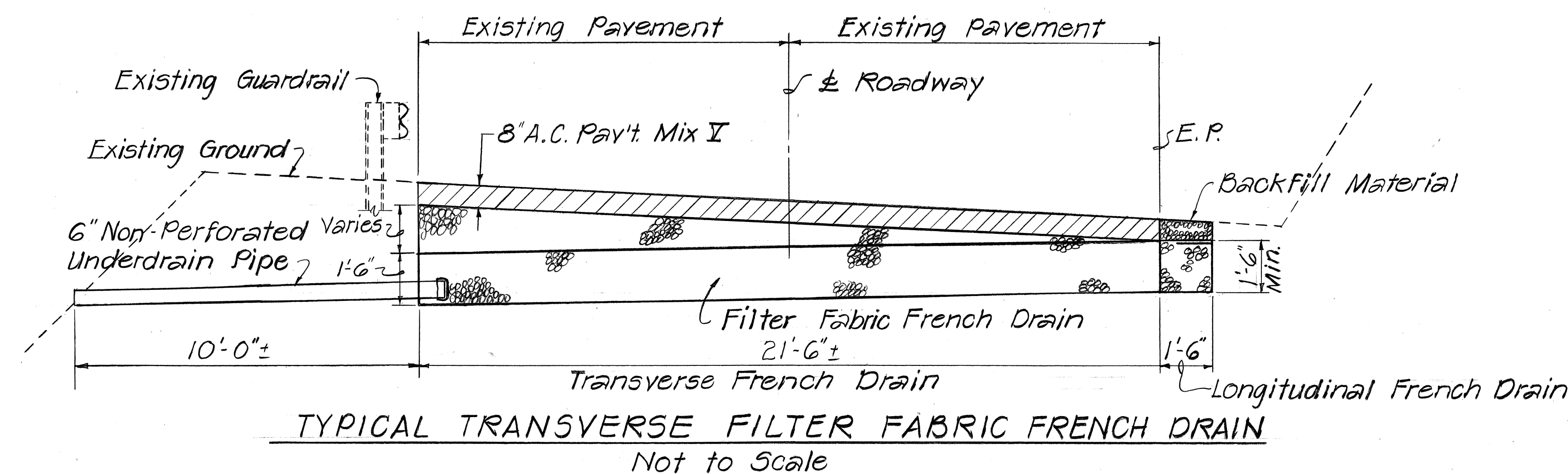
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-84	1984	11	29



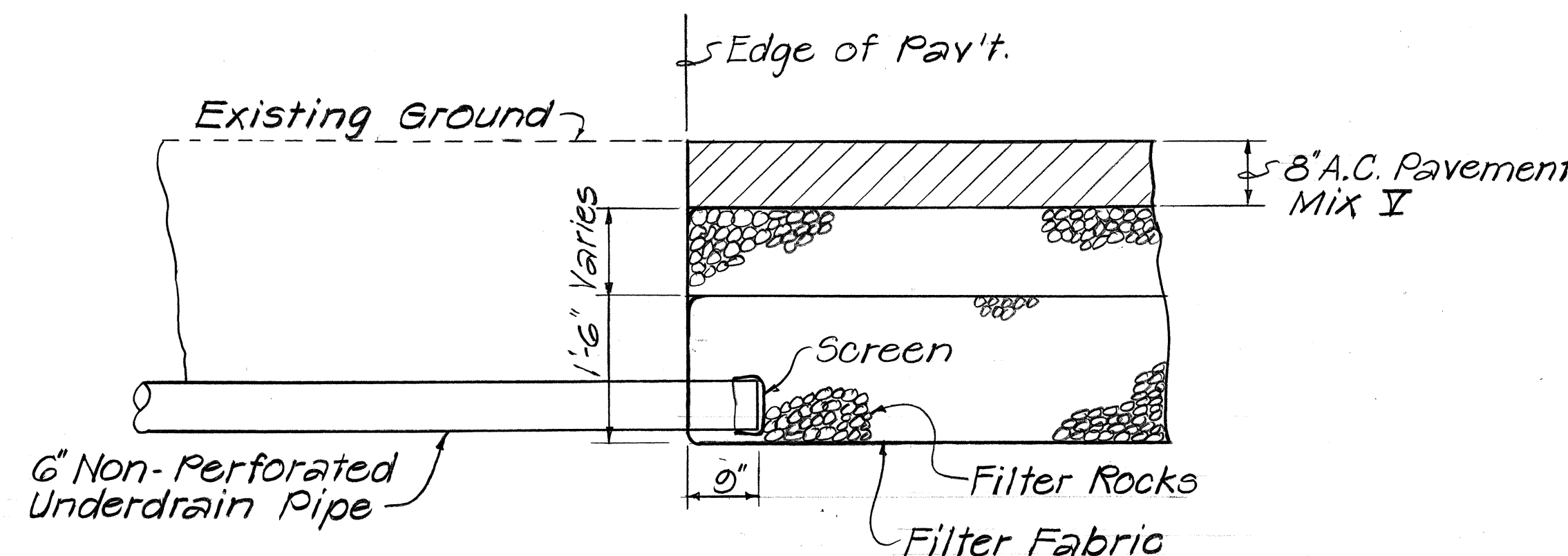
ESTIMATED QUANTITIES
 Restoration of Existing City and/or County Streets and Other Improvements ----- 110 s.f.
 Filter Fabric French Drain -- 73 l.f.

GENERAL NOTES:

1. Typical Section of Longitudinal and Transverse Filter Fabric French Drain are identical.
2. Longitudinal Filter Fabric French Drain shall be constructed along the low side of the superelevation. Transverse Filter Fabric French Drain shall be constructed as shown on plans and/or as directed by the Engineer.
3. Filter Fabric French Drain shall be constructed 8" below top of A.C. Pavement or existing ground.
4. The exact location and length of non-perforated underdrain pipes shall be determined by the Engineer. The excavation and installation of the non-perforated underdrain pipes will not be measured and paid for separately, but shall be considered incidental to Filter Fabric French Drain.
5. Restoration of existing road demolished by the installation of french drain shall be paved with 8" A.C. Pavement, Mix V. This work shall be measured and paid according to Section 627-RESTORATION OF EXISTING CITY AND/OR COUNTY STREETS AND OTHER IMPROVEMENTS.
6. The Filter Fabric French Drain with the underdrain pipes shall be sloped toward the outlet.



TYPICAL SECTION OF TRANSVERSE FILTER FABRIC FRENCH DRAIN
 Scale: 3/4" = 1'-0"



TYPICAL SECTION OF 6" NON-PERFORATED UNDERDRAIN PIPE OUTLET
 Scale: 3/4" = 1'-0"

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
FRENCH DRAIN & GEN. NOTES
HANA HIGHWAY IMPROVEMENTS
HONOMANU TOWARDS HANA
PROJ. NO. 360AB-01-84
 SCALE: AS NOTED JULY 1983
 SHEET NO. 5 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-01-84	1984	48 115-1	29

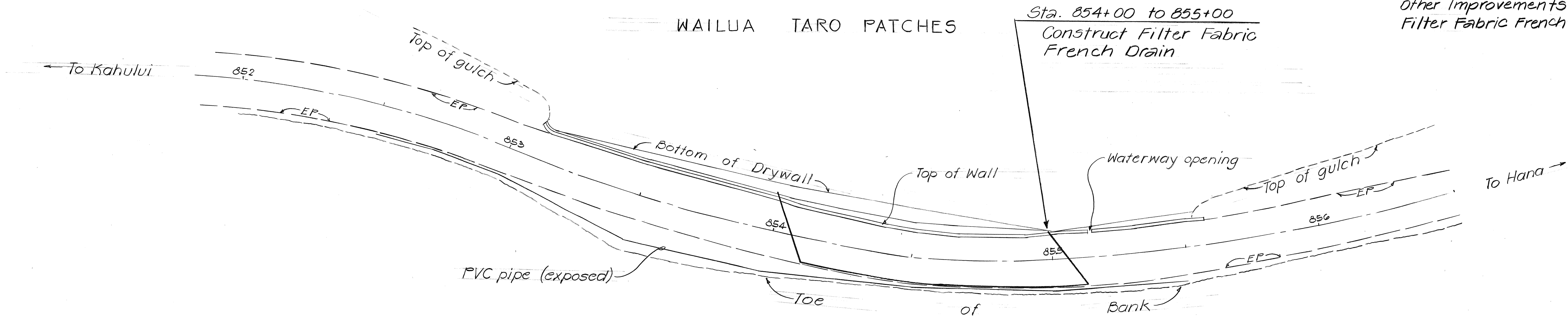
ESTIMATED QUANTITIES

Restoration of Existing City and/or County Streets and Other Improvements-----
 Filter Fabric French Drain--148 l.f.

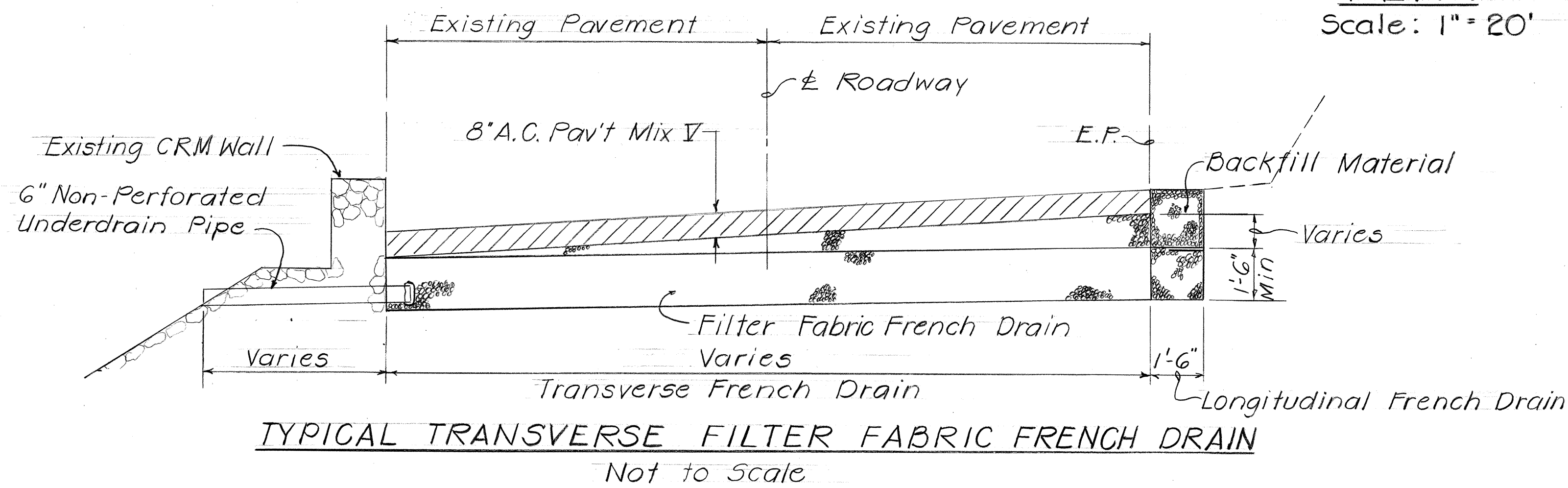
218

222 s.f.

148 l.f.



PLAN
 Scale: 1" = 20'

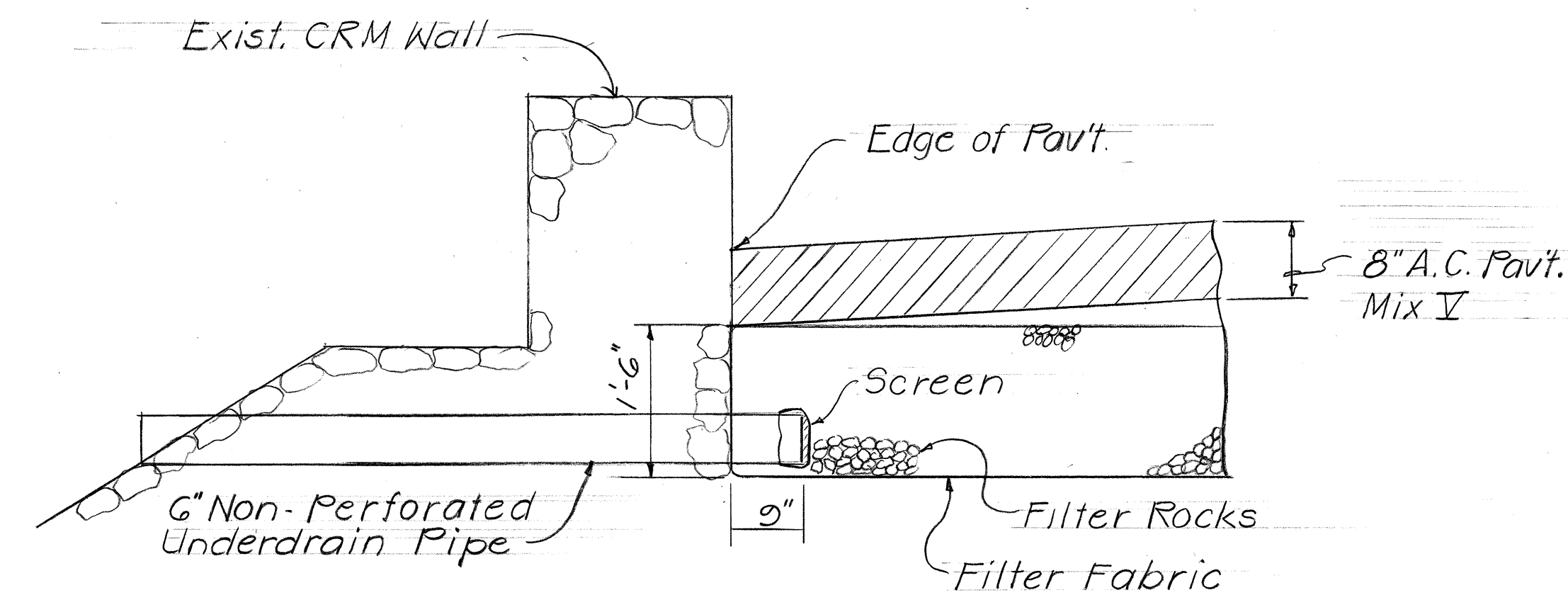


TYPICAL TRANSVERSE FILTER FABRIC FRENCH DRAIN
 Not to Scale

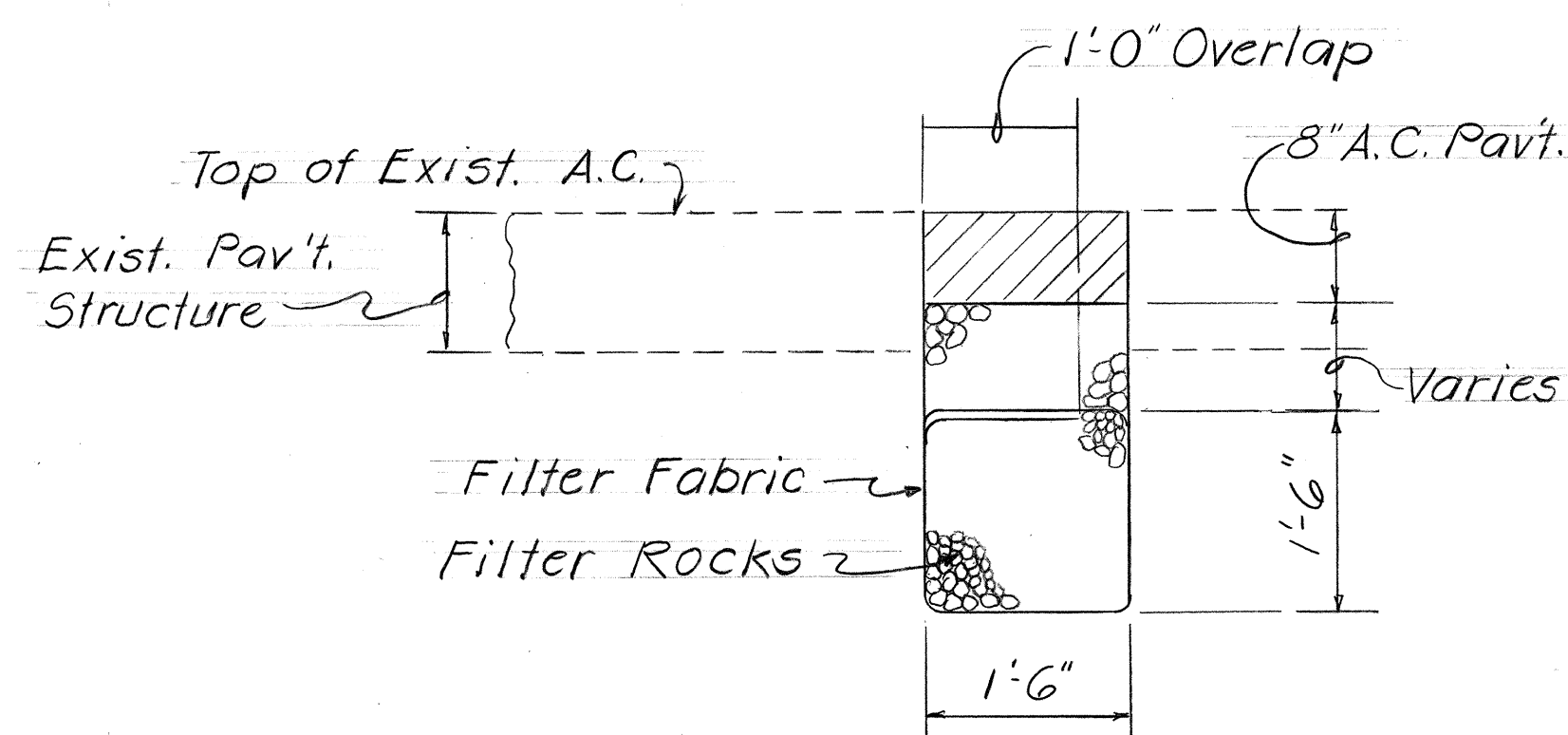
GENERAL NOTES:

1. Typical Section of Longitudinal and Transverse Filter Fabric French Drain
2. Longitudinal Filter Fabric French Drain shall be constructed along the high side of the superelevation. Transverse Filter Fabric French Drain shall be constructed as shown on plans and/or as directed by the Engineer.
3. Filter Fabric French Drain shall be constructed 8" below top of A.C. Pavement or existing ground.
4. The exact location and length of non-perforated underdrain pipes shall be determined by the Engineer. The excavation and installation of the non-perforated underdrain pipes will not be measured and paid for separately, but shall be considered incidental to Filter Fabric French Drain.
5. Restoration of existing road demolished by the installation of French drain shall be paved with 8" A.C. Pavement, Mix V. This work shall be measured and paid according to Section 627 - RESTORATION OF EXISTING CITY AND/OR COUNTY STREETS AND OTHER IMPROVEMENTS.
6. The Filter Fabric French Drain with the underdrain pipes shall be sloped toward the outlet.

C.C.O. No. 1



TYPICAL SECTION OF 6" NON-PERFORATED UNDERDRAIN PIPE OUTLET
 Scale: 3/4" = 1'-0"

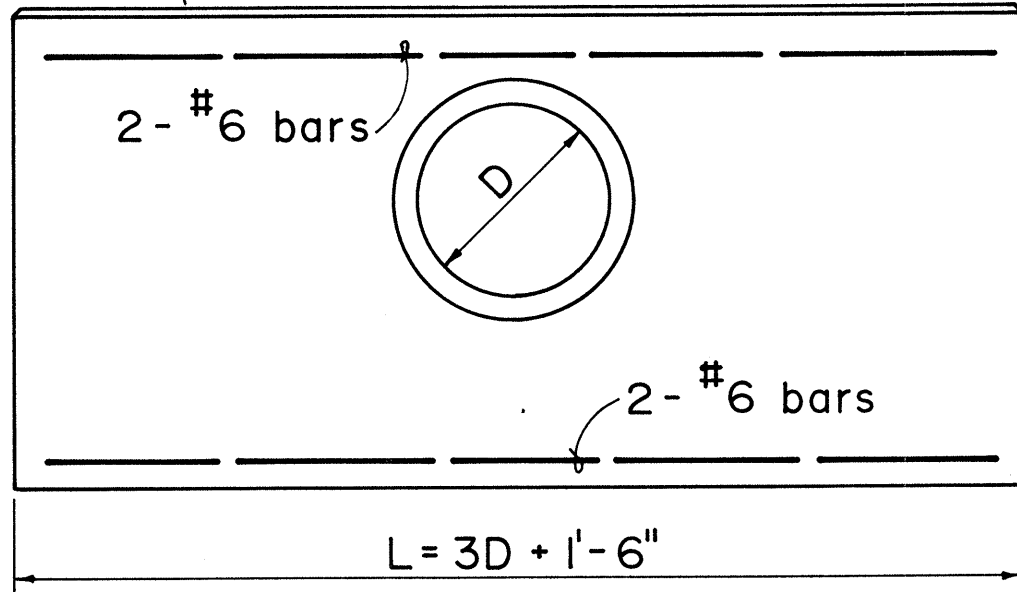


TYPICAL SECTION OF TRANSVERSE FILTER FABRIC FRENCH DRAIN
 Scale: 3/4" = 1'-0"

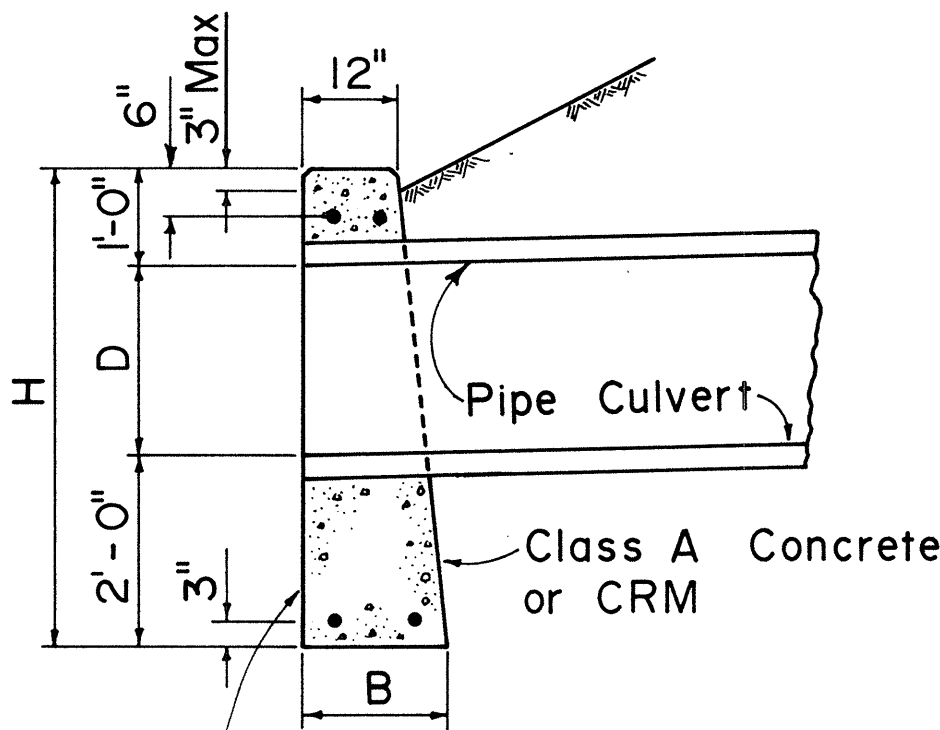
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
 FRENCH DRAIN & GEN. NOTES
 HANA HIGHWAY IMPROVEMENTS
 HONOLULU TOWARDS HANA
 PROJ. NO. 360AB-01-84
 CONTRACT CHANGE ORDER No. 1
 SCALE: AS NOTED NOV. 1983
 SHEET No. 52 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	360AB-018A	1984	12	29

Chamfer all exposed edges one inch



ELEVATION



Culvert shall be neatly cut flush with this face.

SECTION

DATA FOR CONC. HDWL.			
D	B	L	H
18"	1'-6"	6'-0"	4'-6"
24"	1'-6"	7'-6"	5'-0"
30"	2'-0"	9'-0"	5'-6"
36"	2'-0"	10'-6"	6'-0"
42"	2'-6"	12'-0"	6'-6"
48"	2'-6"	13'-6"	7'-0"

DATA FOR CRM HDWL.			
D	B	L	H
18"	1'-9"	6'-0"	4'-6"
24"	2'-0"	7'-6"	5'-0"
30"	2'-3"	9'-0"	5'-6"
36"	2'-6"	10'-6"	6'-0"

CONCRETE OR CRM HEADWALL

APPROVAL RECOMMENDED:
T. Takano
 HYDRAULIC DESIGN ENGINEER 6-19-79
 DATE

APPROVED:
Harold Zaleski
 ASSISTANT CHIEF, ENGINEERING 6-22-79
 DATE

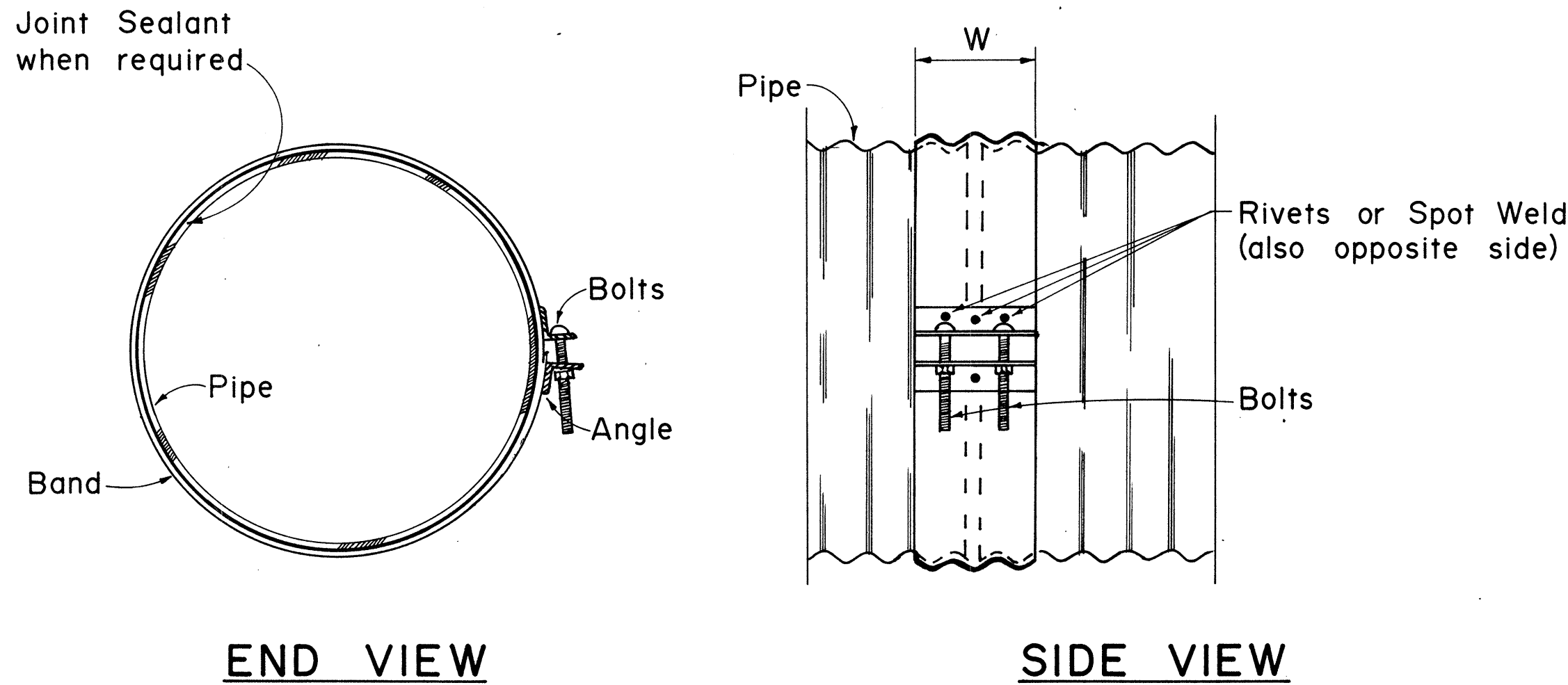
NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 10 approved 12-17-69	H.T.	6/22/79
2.	Change Class of concrete	H.T.	12/4/80

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

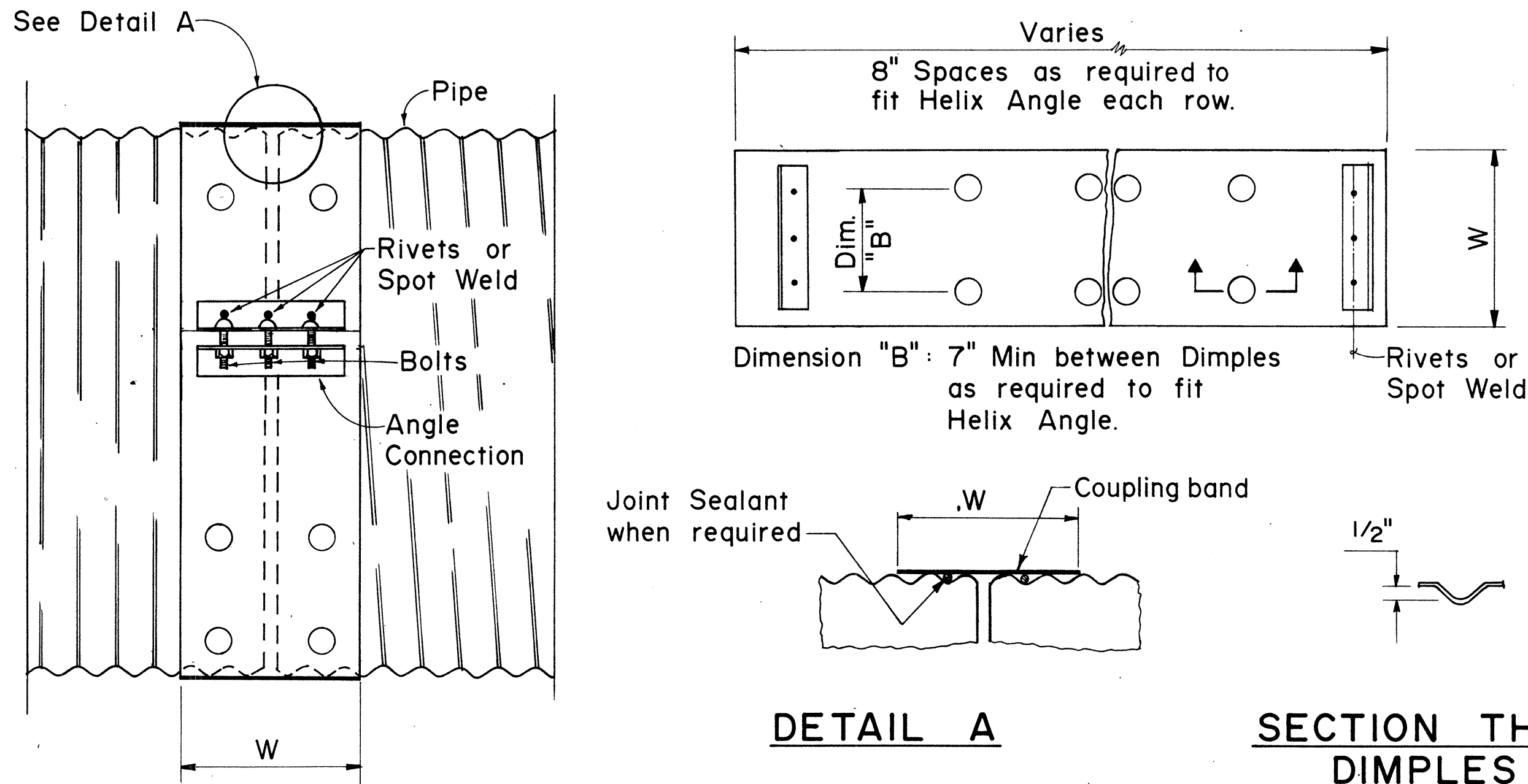
STANDARD DETAILS
 CONCRETE OR CEMENT
 RUBBLE MASONRY HEADWALLS

Not To Scale
 Date: June 1979

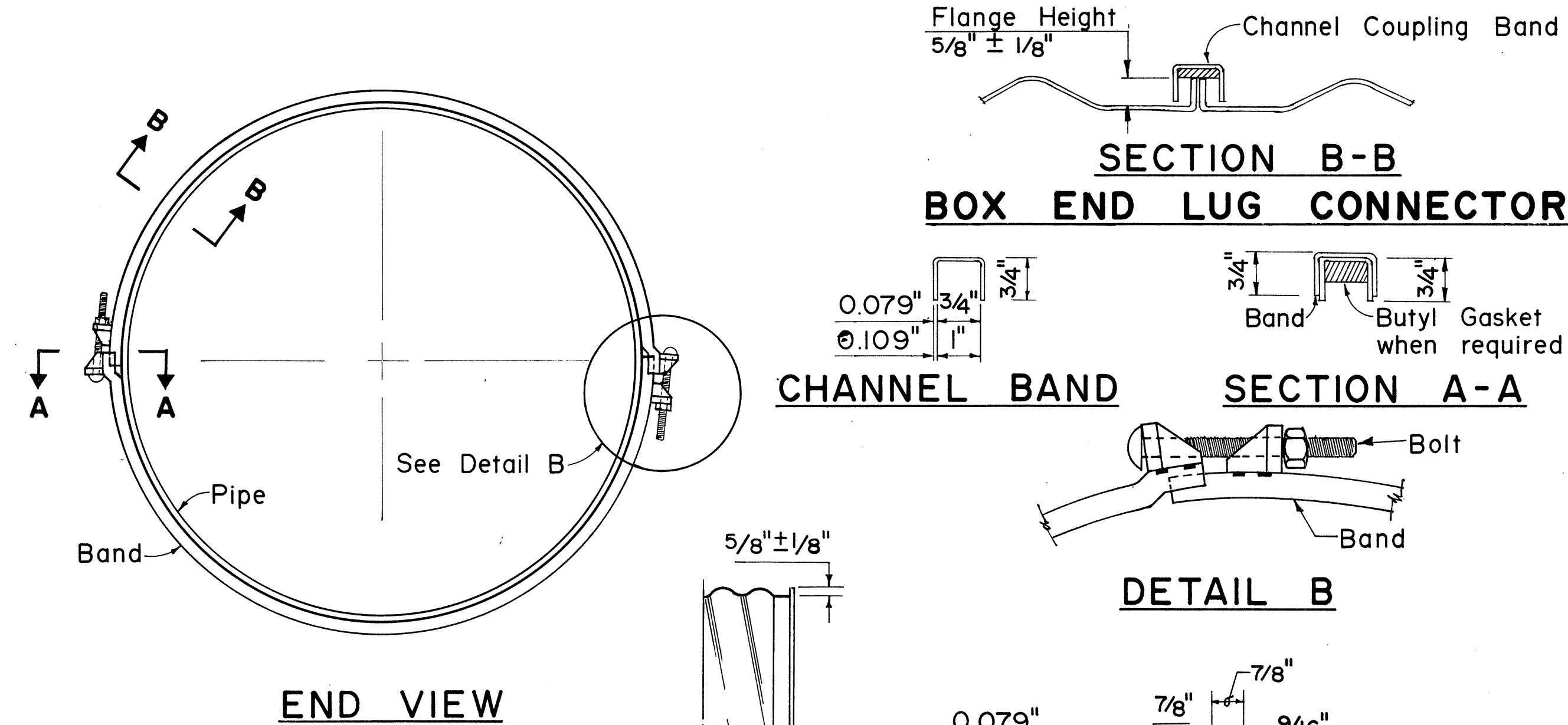
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	300AB010A	1984	73	29



END VIEW
SIDE VIEW
ANNULAR COUPLING BAND

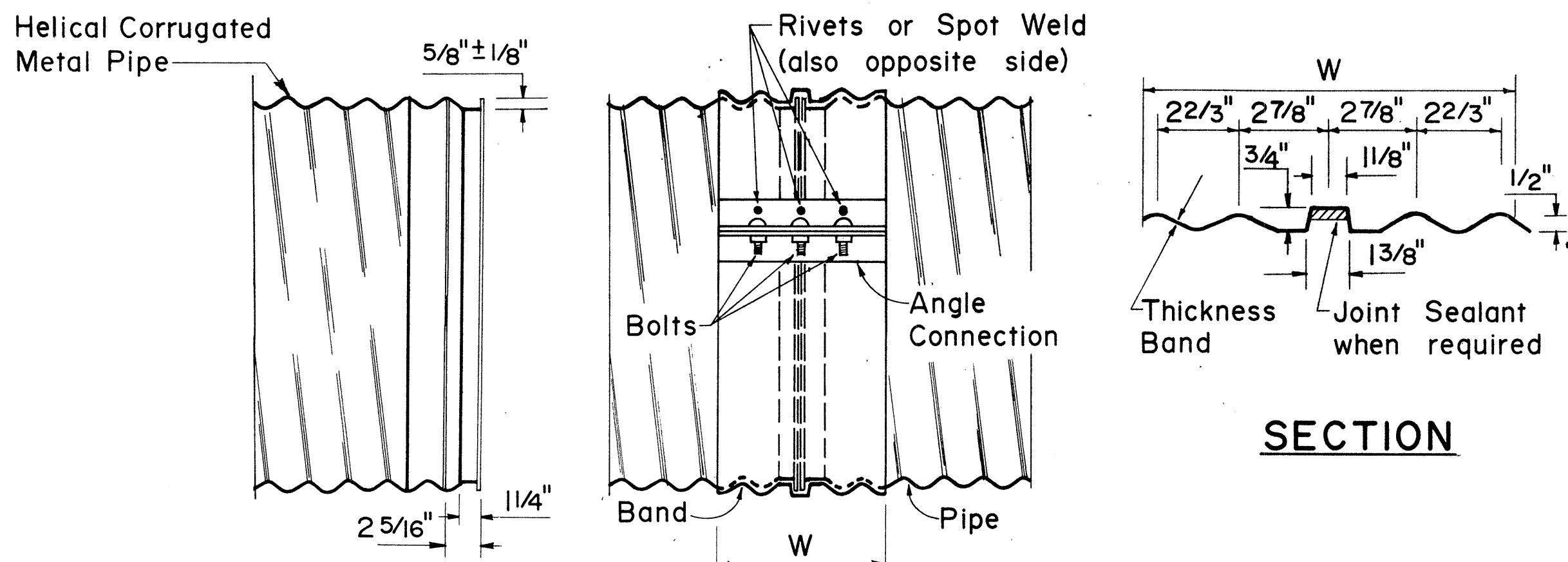


UNIVERSAL COUPLING BAND ANGLE CONNECTION



SECTION B-B
BOX END LUG CONNECTOR
CHANNEL BAND
SECTION A-A
DETAIL B

REFORMED END
CHANNEL COUPLING BAND FOR USE ON REFORMED END C.M.P.



REFORMED END
SIDE VIEW
WING CHANNEL COUPLING BAND FOR REFORMED END H.C.M.P.

- GENERAL NOTES**
1. All coupling band connection hardware shall be galvanized or electro plated in accordance with Standard Specifications.
 2. For pipe arches use same width band as for round pipe of same periphery.
 3. Two pieces band required for pipe greater than 48" diameter.
 4. Fillet welds of equivalent strengths may be substituted for spot welds or rivets.
 5. Dimensions and thickness shown are in inches and are nominal.

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	ANGLE CONNECTIONS-QUANTITIES PER CONNECTION			
					DIMENSIONS	BOLTS	RIVETS	SPOT WELD
UNIVERSAL	22/3 x 1/2	12 - 36	10 1/2	0.075-0.138	2ea 2x2x3/16x7	2 ea 1/2x6	3ea 3/8	3ea 1/2
		42- 60	16 1/2	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		66- 84	16 1/2	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
	3 x 1	36- 72	10 1/2	0.075-0.138	2ea 2x2x3/16x7	2 ea 1/2 x 6	3ea 3/8	
		78-120	16 1/2	0.075-0.138	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
ANNULAR	22/3 x 1/2	12 - 36	7	0.075-0.138	2ea 2x2x3/16x7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2
		42- 72	12	0.075-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		78- 84	12	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
	3 x 1	36- 42	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
		48- 84	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		90-120	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	LUG TYPE CONNECTORS-QUANTITIES PER CONNECTION		
					DIMENSIONS	BOLTS	SPOT WELD
CHANNEL	22/3 x 1/2	12 - 72		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4ea 1/2
	3 x 1	36- 72		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4ea 1/2
WING	22/3 x 1/2	12 - 72	12	0.075-0.138	6 ea Lugs	3 ea 1/2 x 6	12ea 1/2
		78- 84	12	0.164-0.168	6 ea Lugs	3 ea 1/2 x 6	12ea 1/2
	3 x 1	36-120	12	0.075-0.109	6 ea Lugs	3 ea 1/2 x 6	12ea 1/2

APPROVAL RECOMMENDED:
P. Pabano
 HYDRAULIC DESIGN ENGINEER 9-7-79
 DATE

APPROVED:
Robert R. Zakech
 ASSISTANT CHIEF, ENGINEERING 9-14-79
 DATE

NO.	REVISION	APPROVED BY	DATE
1.	Revise pipe wall thickness from table and delete note #6.	<i>P.D.</i>	9-7-83

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

STANDARD DETAILS
C.M.P. COUPLING DETAILS
 STANDARD JOINT

Not To Scale Date: Sept. 1979