

DRAINAGE SUMMARY

Shoulder Improvement of Interstate Route H-1
PROJ. Keeaumoku St. to Old Wai'aleae Rd. PROJ. NO. I-HI-I(60)-23

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IHI-1(60)-23	1976	63	181

STRUCTURES			ESTIMATED QUANTITIES																				REMARKS																
NUMBER	TYPE	STATION	ITEM NO.	206	503	503	602	602	603	603	603	603	603	604	604	604	604	604	604	604	604	604																	
			DETAIL SHEET	01	001	030	020	101	1006	1026	1088	1002	1003	010	201	220	232	237	239	301	302	305																	
				UNIT USED	C.Y.	C.Y.	C.Y.	Lb.	Lb.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Each	Each	Each	Each	Each	Each	Each	Each															
#1 to #11	C.B.	# Sta. 229+86.8± W.B. to 234+25± W.B.	3H, 4H																			Details of concrete barrier at the vicinity of the C.B.'s & clear throat opening of C.B.'s																	
#12	Grated Inlet	# Sta. 230+01± E.B.	5H, 41 H	7.0	3.5			585									6																						
#13	S.D.M.H.	# Sta. 234+25± W.B.	6H																			Details of concrete barrier at the vicinity of the C.B. & clear throat opening of C.B.'s																	
#14	C.B.	# Sta. 234+72.5± E.B.																				Details of slotted opening in concrete barrier, See Roadway Plans.																	
#15	C.B.	# Sta. 235+21.5± W.B.	6H																			Details of conc. barrier over S.D.M.H.																	
#16	C.B.	# Sta. 240+90± W.B.	7H, 40H	1.0	3.0			753						1																									
#17	Grated Inlet	# Sta. 245+90± E.B.	8H, 37H	2.0	2.5			864									5					Reinstall Type "B" C.I. Frame and Cover @ S.D.M.H. @ # Sta. 251+10± W.B.																	
#18	Grated Inlet	# Sta. 246+03.2± W.B.	10H, 37H	4.5	4.0			646									5					Reinstall Type "B" C.I. Frame and Cover @ C.B. @ # Sta. 251+70± W.B.																	
#19	Concrete Collar	# Sta. 250+67± W.B.	10H																																				
#20	New S.D.M.H.	# Sta. 251+19± W.B.	11H, 40H	59.0	2.5			48																															
#21	New C.B.	# Sta. 251+70± W.B.	12H, 40H	200.0	8.0			996																															
#22	Type "A" S.D.M.H.	# Sta. 253+80.3± W.B.	39H, 40H	143.0	3.0			225												1		For details of Standard Type "A" S.D.M.H., see sht. no. 59H																	
#23	New S.D.M.H.	# Sta. 255+40± W.B.	13H, 40H	8.0	3.5			485						1																									
#24	C.B.	# Sta. 257+25± E.B.	14H, 40H	0.5	5.0			710			156			1																									
#25	C.B.	# Sta. 262+75± W.B.	10H, 11H, 40H	15.5	6.5			1122				12		1																									
#26	Grated Inlet	# Sta. 264+65± W.B.	16H, 41 H																																				
#27	C.B.	# Sta. 264+65± E.B.	15H	3.5	3.5			528									3																						
#28	C.B.	# Sta. 265+25± W.B.	17H, 40H	4.0	6.0			981						1																									
#29	S.D.M.H.	# Sta. 265+50± W.B.	18H, 40H	3.5	1.5			254						1																									
#30	C.B.	# Sta. 269+50± E.B.	19H, 20H, 40H	1.5	2.5			404						1																									
#31	Modified C.B.	# Sta. 271+31± W.B.	21H, 22H 30H, 41H	7.0	2.0			433											3																				
#32	C.B.	# Sta. 271+57± W.B.	21 H	14.0	4.0			561						1																									
#33	Grated Inlet	# Sta. 274+60± W.B.	23H, 41 H	13.5	5.0			714			6						3																						
#34	C.B.	# Sta. 274+60± E.B.	19H, 20H, 40H	1.5	5.5			716						1																									
#35	Modified C.B.	# Sta. 277+13± W.B.	24H, 41 H	5.0	2.0			143									3																						
#36	C.B.	# Sta. 277+13± E.B.	19H, 20H, 40H	1.0	3.0			611						1																									
#37	C.B.	# Sta. 279+39± E.B.	25H, 40H	1.5	2.0			713						1																									
#38	S.D.M.H.	# Sta. 280+24± E.B.	26H	0.5	1.0			154																															
Sub - Total - This Sheet				506.0	79.5			12,646				162	12	462		11		15	10	3	1	2	14																
				SHEET NO. 14 OF 417 SHEETS																																			

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

S U M M A R Y

PROJ. NO. I-HI-1(60):23

FED. ROAD DIST. NO.	STATE	FED AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FHA 16023	1976	64	181

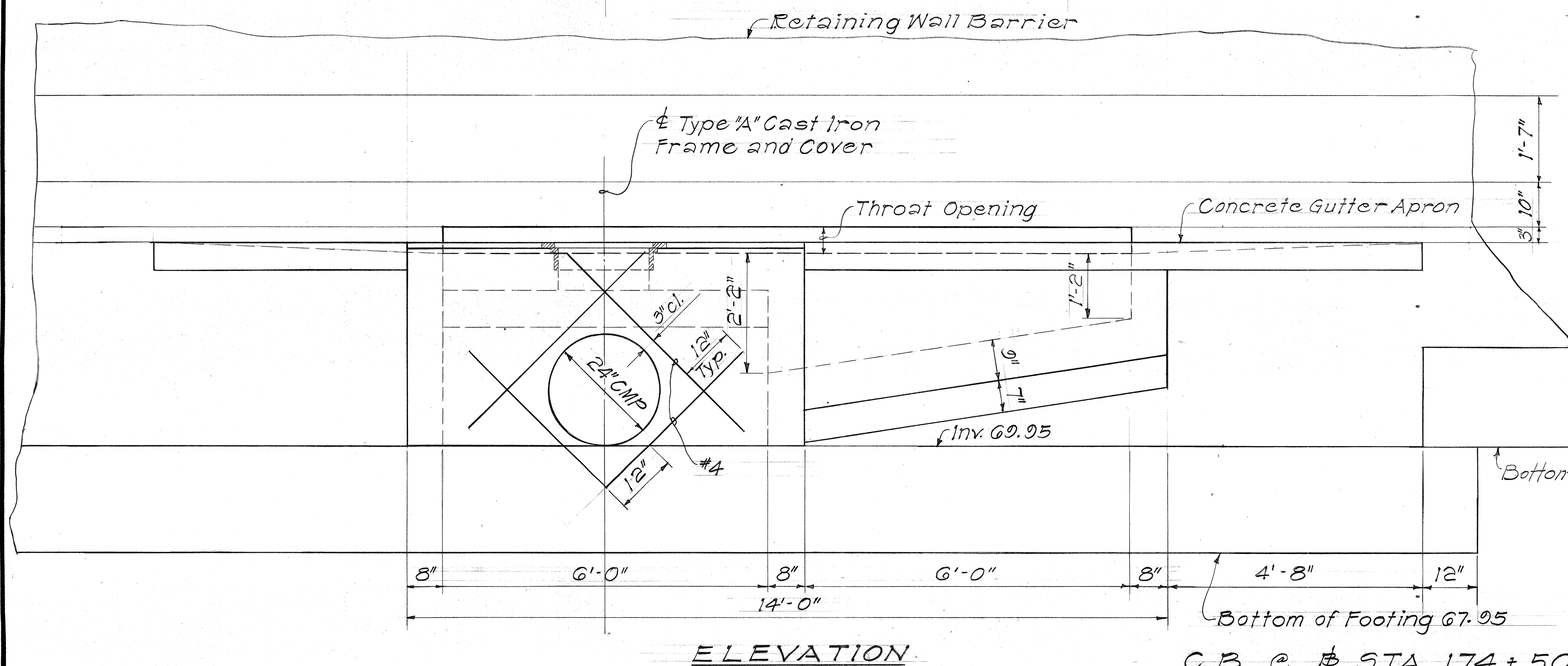
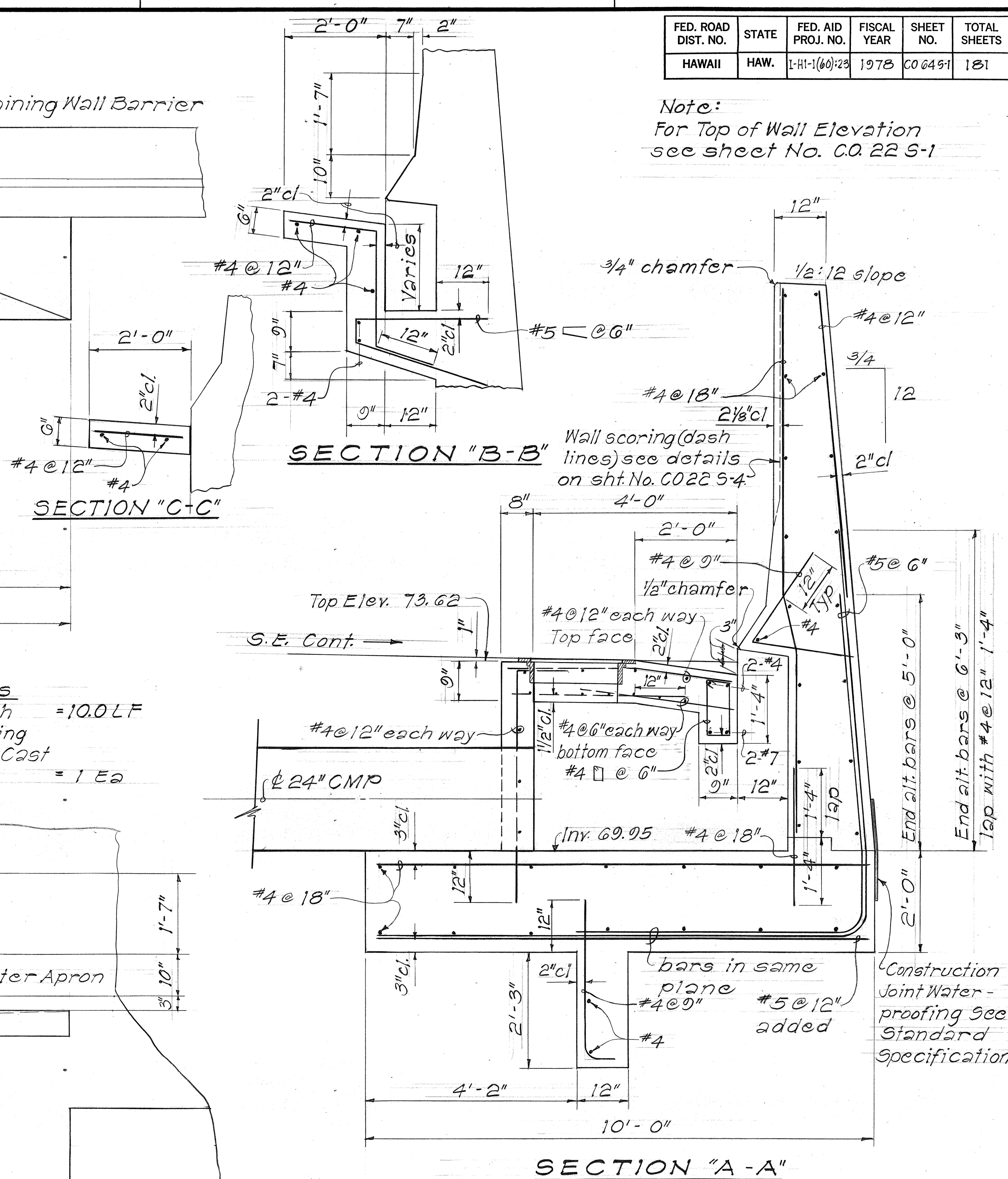
STRUCTURES				ESTIMATED QUANTITIES																		REMARKS															
NUMBER	TYPE	STATION	ITEM NO.	206	503	503	602	602	603	603	603	603	603	604	604	604	604	604	604	604	604	604															
			DETAIL SHEET	Struct. Excavation other than at Bridges	Concrete other than in Bridges	Concrete in Box Culvert	Reinforcing Steel in Box Culverts	Reinforcing Steel other than in Bridges	18 inch Reinforced Concrete Pipe C.I. III	72 inch Reinforced Concrete Pipe C.I. III	24 inch Reinforced Concrete Pipe C.I. X	Remove, Clean and Relay Existing 18" Pipe	Remove, Clean and Relay Existing 24" Pipe	Brick Wall for Storm Drain Manholes	Type A' C.I. Frame and Cover	C.I. Frame and Cover for Pressure Manhole	Type A-12 Steel Frame and Grate	Type G-1:20:1-4 Steel Frame and Grate	Modified Type A-12 Steel Frame and Grate	Removing, Cleaning, Painting & Reinstalling Type A.C.I. Fm. & Cover	Removing, Cleaning, Painting & Reinstalling Type B.C.I. Fm. & Cover	Removing, Cleaning, & Returning Type "B" C.I. Framed Cover															
			UNIT USED	C.Y.	C.Y.	C.Y.	Lb.	Lb.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Each	Each	Each	Each	Each	Each	Each	Each														
#39	New S.D.M.H.	@ Sta. 280+34 ± E.B.	26H	137.0	50			475			156				1																						
#40	Modified C.B.	@ Sta. 1+97± E.B.	18H	2.5	1.0			61																													
#41	Grated Inlet	@ Sta. 2+65± E.B.	27H, 41H	24.0	50			697								8																					
#42	Modified C.B.	@ Sta. 3+44± W.B.	28H, 38H	05	1.0			175												1																	
#43	S.D.M.H.	@ Sta. 6+15± W.B.	29H, 40H	0	1.0			238						1								1															
#44	C.B.	@ Sta. 6+35± W.B.	29H, 30H, 40H	0.0	5.0			628						1								1															
#45	Grated Inlet	@ Sta. 6+45± E.B.	15H, 37H	8.5	35			602									2					1															
#46	Grated Inlet	@ Sta. 10+25± E.B.	31H, 37H	11.0	4.0			423		4							2					1															
#47	Grated Inlet	@ Sta. 20+83 ± W.B.	16H, 32H, 37H	6.0	5.0			523									2					1															
#48	Grated Inlet	@ Sta. 22+84± E.B.	13H, 37H	6.0	4.5			387									2					1															
#49	Grated Inlet	@ Sta. 24+37± W.B.	31H, 37H	14.0	5.0			439									2					1															
#50	Grated Inlet	@ Sta. 27+03 W.B.	32H, 37H	0.0	5.0			476									2					1															
#51	Grated Inlet	@ Sta. 29+00± W.B.	32H, 37H	0.5	5.0			481									2					1															
Sub ~ Total ~ This Sheet				237.0	50.0			5605			160			2	1	8	14				1	9															
Total ~ Sheet No. 1 & 2				743.0	122.5			18251			322	12	462		13	1	23	24	3	1	3	23															
Rounded Total				745.0	130.0			18251			322	12	462		13	1	23	24	3	1	3	23															
Non ~ Participating																																					
	72" RCP Crossing	@ Sta. 281+51.8	34H, 35H, 36H 32H, 40H	762.0		750	12,660		14.0	144			5	1																							

SHEET NO. 24 OF 414 SHEETS.

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ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
NOTE BOOK	DRAWN BY _____	41
	TRACED BY _____	42
	DESIGNED BY _____	43
	QUANTITIES BY _____	44
No. _____	CHECKED BY _____	45

Note:
For Top of Wall Elevation
see sheet No. C.O. 22 S-1



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

1-5-78	Sheet Added to Contract Plan to show details of C.B. at £ St 2 174+50 Rt.
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

DRAINAGE PLANS

FAI Proj No I-HI-1(60):23

Scale: 3/4" = 1'-0" Date: Oct. 1977

SHEET NO. 24A OF 41H SHEETS

C.O.64 S-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (60):23	1976	65	181

TABLE A

C.I.B. No.	Station West Bound	Invert	Elevation ±		
			A	B	C
1	Sta. 229+86.80	33.31	36.55	32.14	31.25
3	Sta. 230+56.80	34.34	37.56	33.67	33.00
4	Sta. 231+23.80	36.08	38.83	35.35	34.50
5	Sta. 231+50.80	36.71	39.27	36.04	35.00
6	Sta. 231+85.80	37.27	39.81	36.60	36.00
9	Sta. 232+89.70	38.87	42.74	39.20	39.00
10	Sta. 233+18.50	40.44	43.28	39.77	39.50

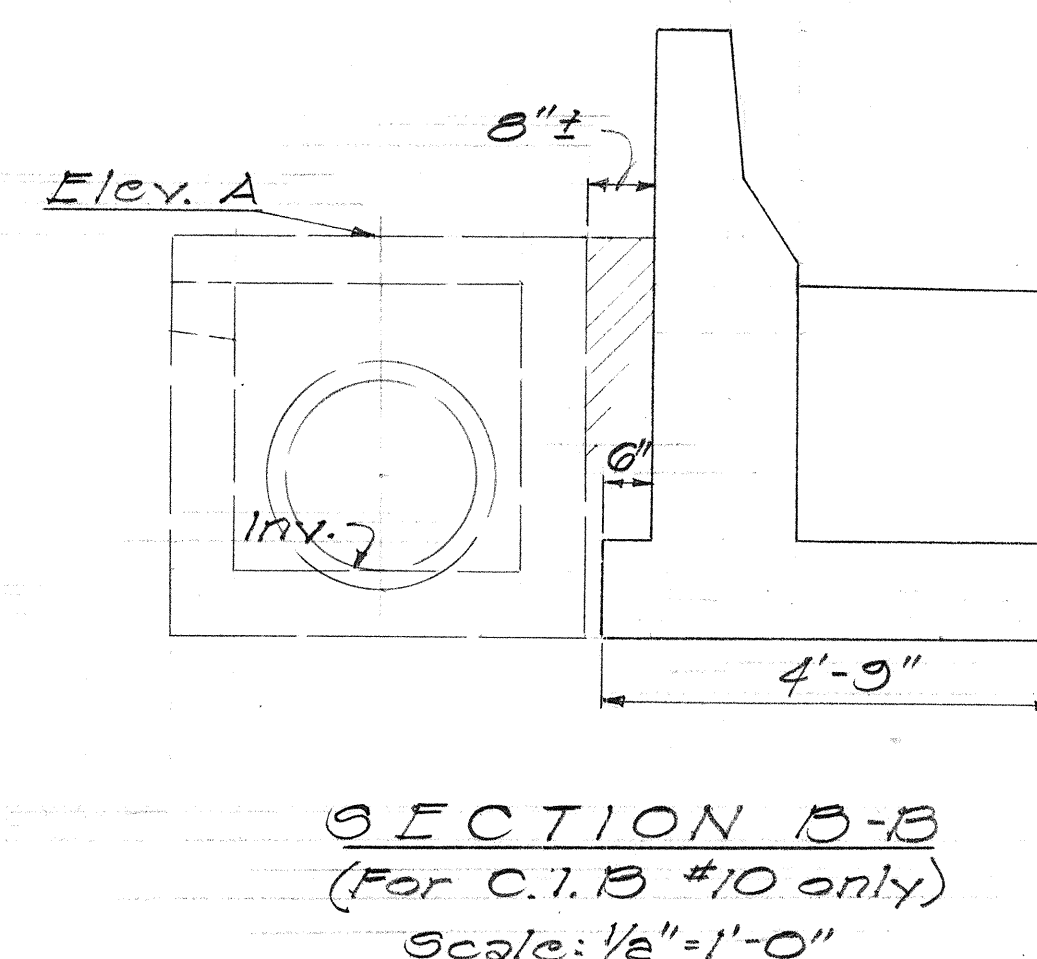
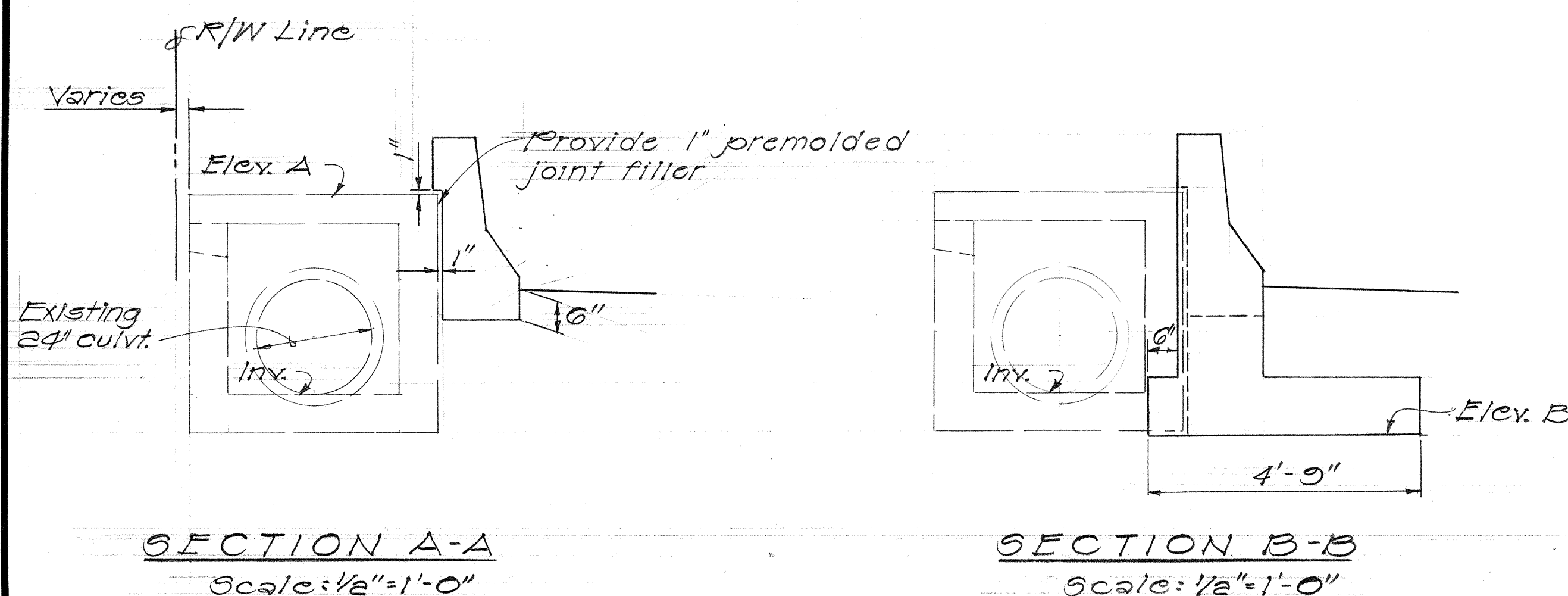
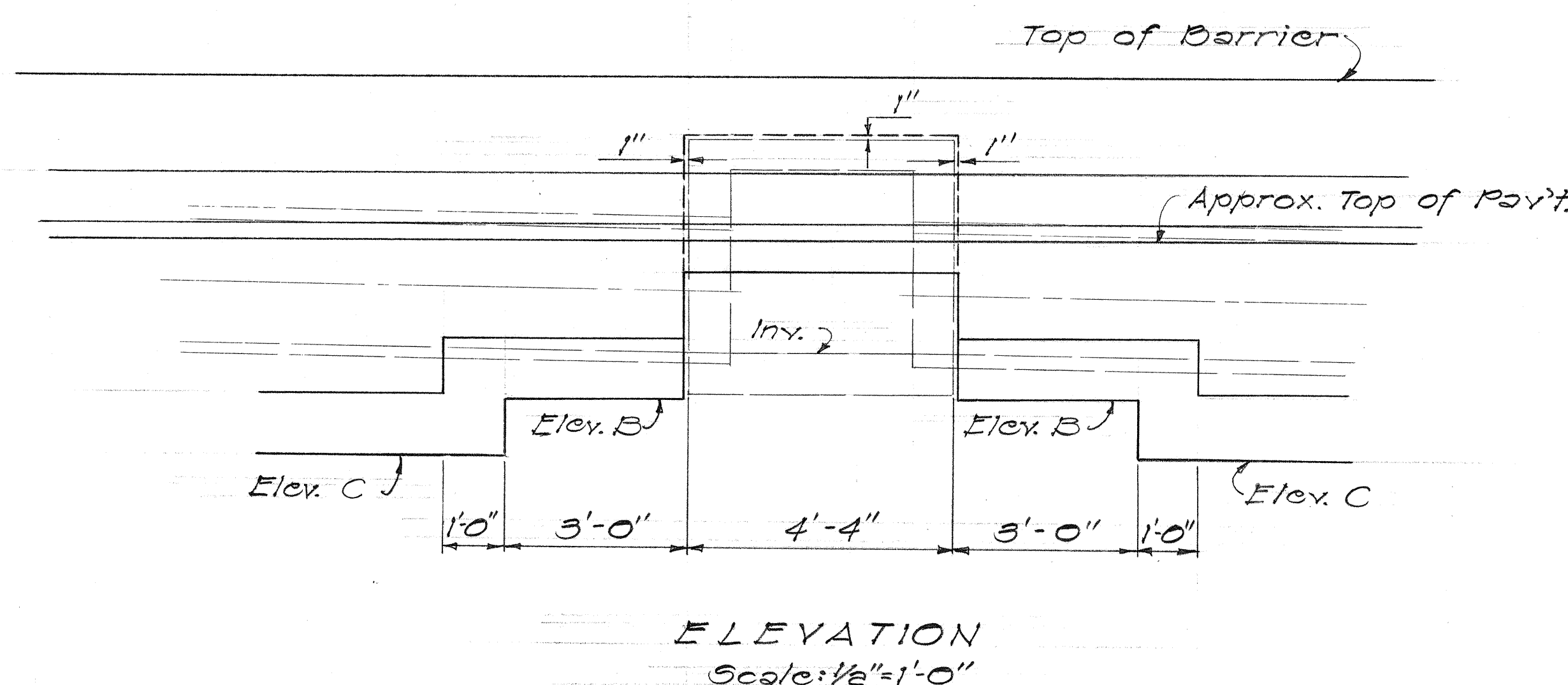
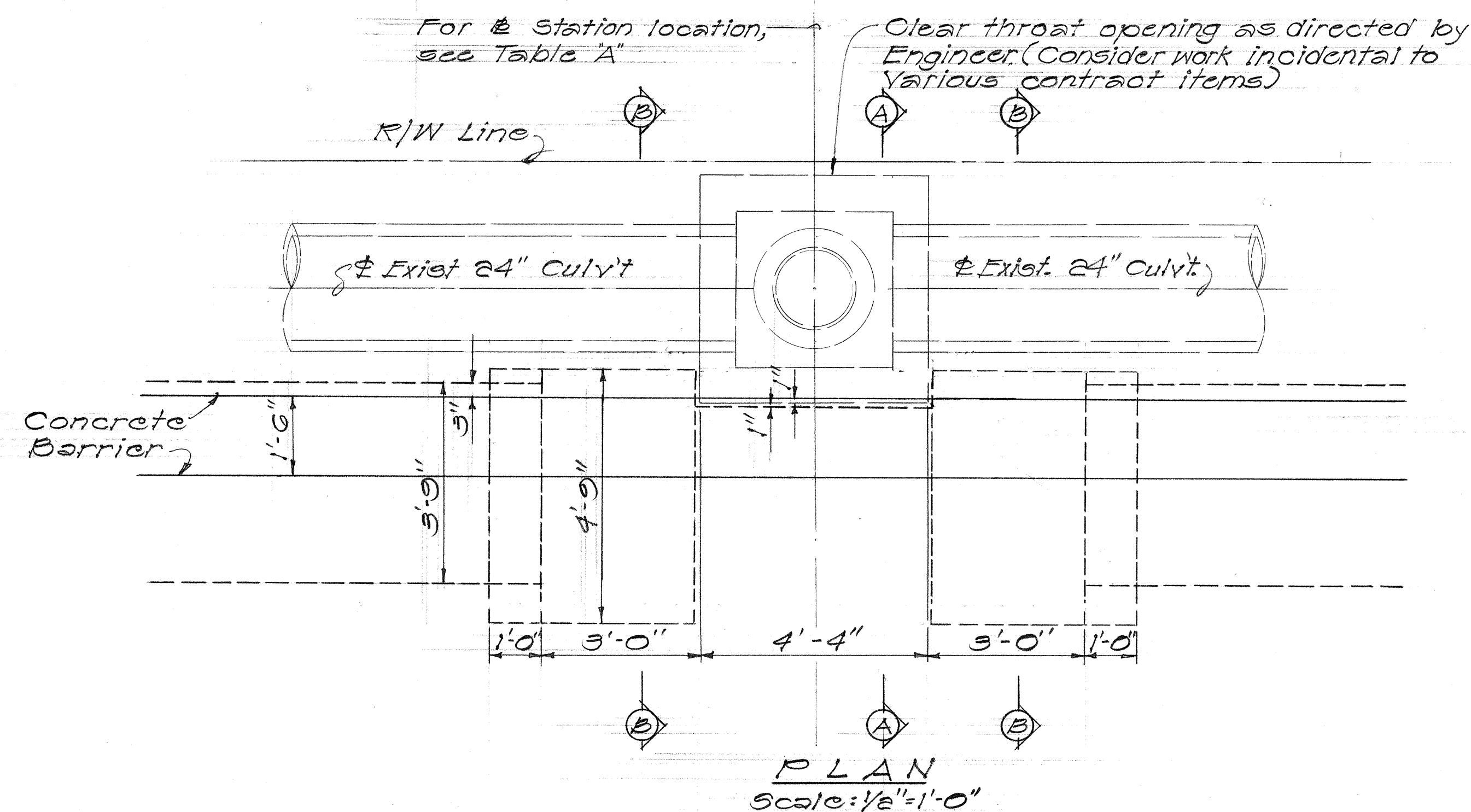
GENERAL NOTES

- Demolishing and removing a portion or the entire existing structure shall not be paid for separately, but shall be considered incidental to the various contract items in the proposal.
- Unnecessary culvert lengths within the catch basins, grated drop intakes and storm drain manholes shall be neatly cut flush with the inside face of the wall. Work mentioned above shall be considered incidental to the various contract items in the proposal.
- Manhole Rungs (18" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. For details of Manhole Rung, see sheet no. 40H. Manhole Rungs may be placed at any location as ordered by the Engineer. Manhole Rungs shall be considered incidental to structural concrete.
- Location of C.I. Frame and Cover for S.D.M.H. or C.B. shall be determined by the Engineer in the field.
- Reconstruction of existing Concrete Curb or Concrete Curb and Gutter shall be considered incidental to the various contract items in the proposal.
- Contractor shall verify the locations of all culverts and sprinkler lines (feeders, laterals, and sub mains) in the field. Any culvert or sprinkler lines (feeders, laterals and sub mains) damaged during construction shall be repaired or replaced by the Contractor at his expense. (See Sprinkler Plans for approximate location of existing sprinkler lines (feeders, laterals and sub mains))
- For typical pavement structure, see typical roadway section.
- Only non-pneumatic type of drill as approved by the Engineer will be permitted for drilling holes in concrete. Where indicated on plans, the approximate diameter of drilled holes for installation of dowels shall be 2 inches; and, voids after installing dowels, shall be filled with mortar as directed by the Engineer. The work (drilling 2" holes & filling voids with mortar) as mentioned above shall be considered incidental to the various contract items in the proposal.

continued on next page

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION DRAINAGE DETAILS

F.A.I. Proj. I-HI-1 (60):23
Scale: As Shown Date: Aug., 1976
SHEET No. 3H OF 41H SHEETS

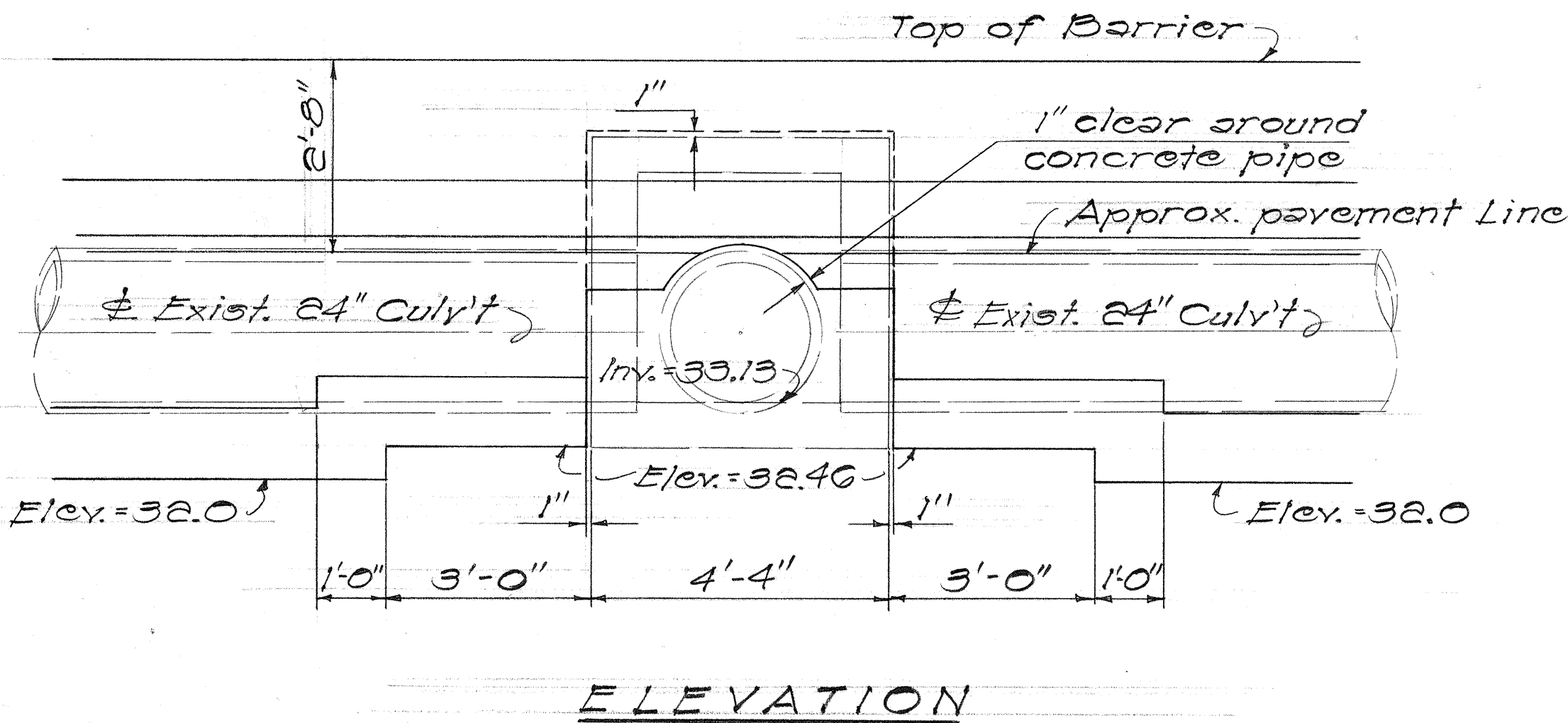
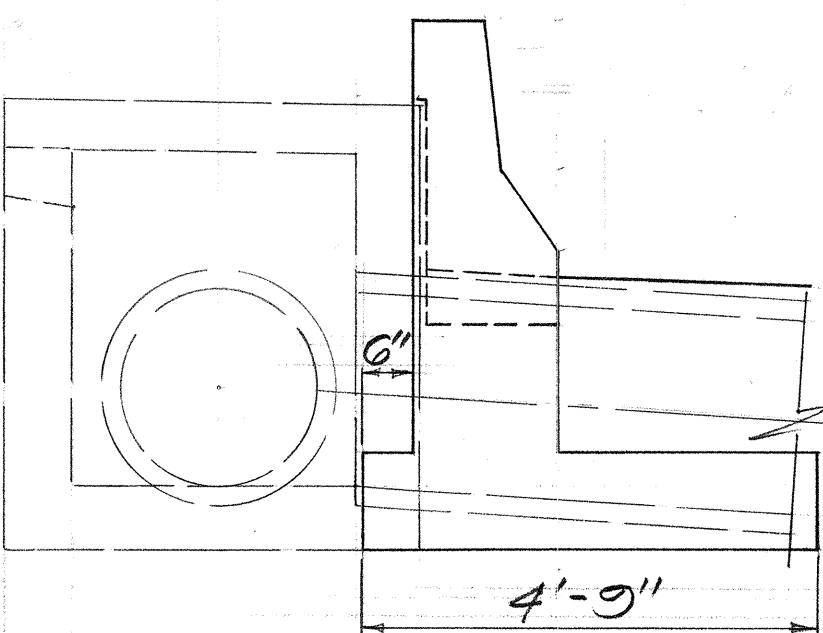
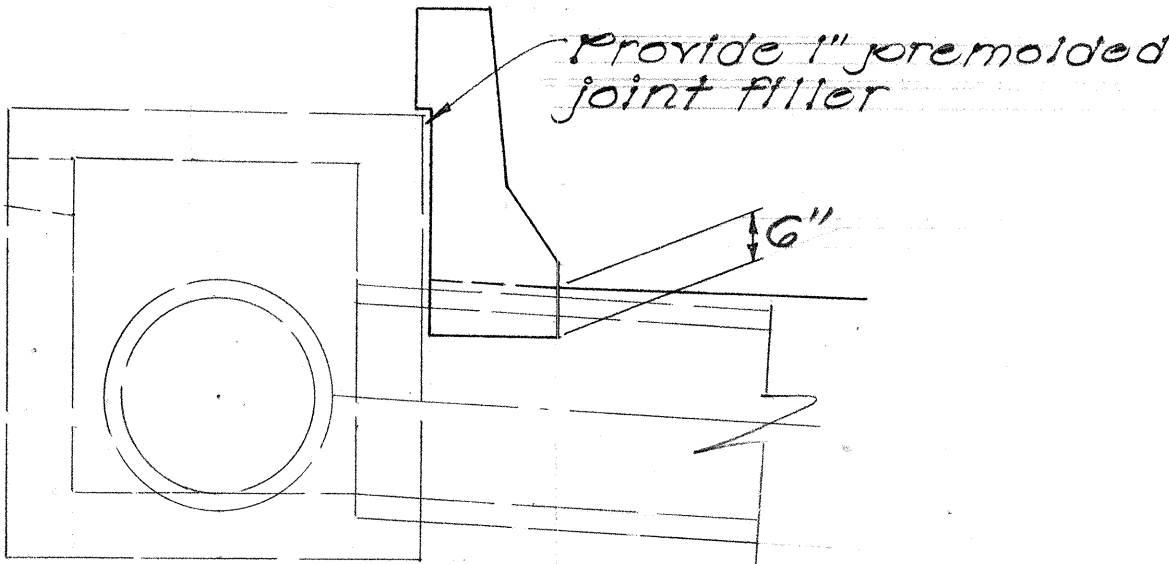
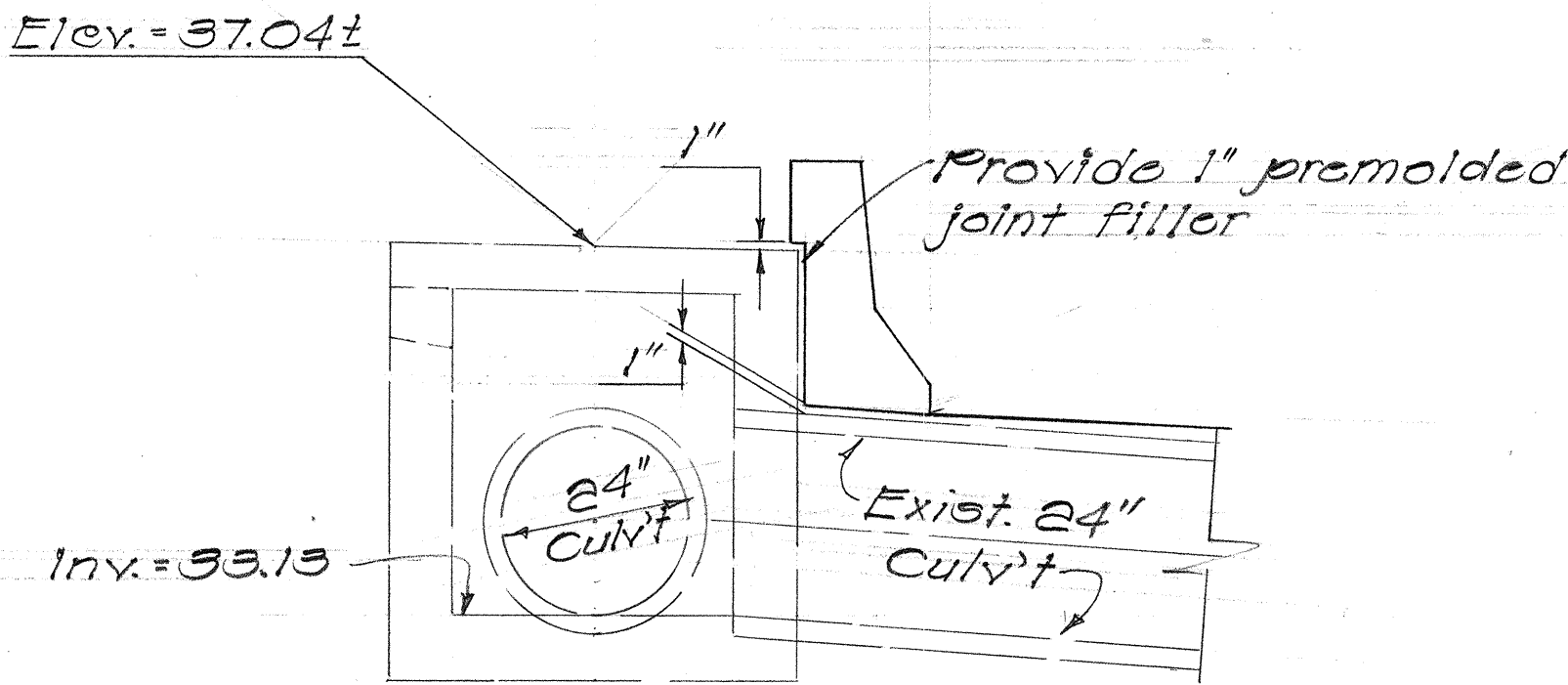
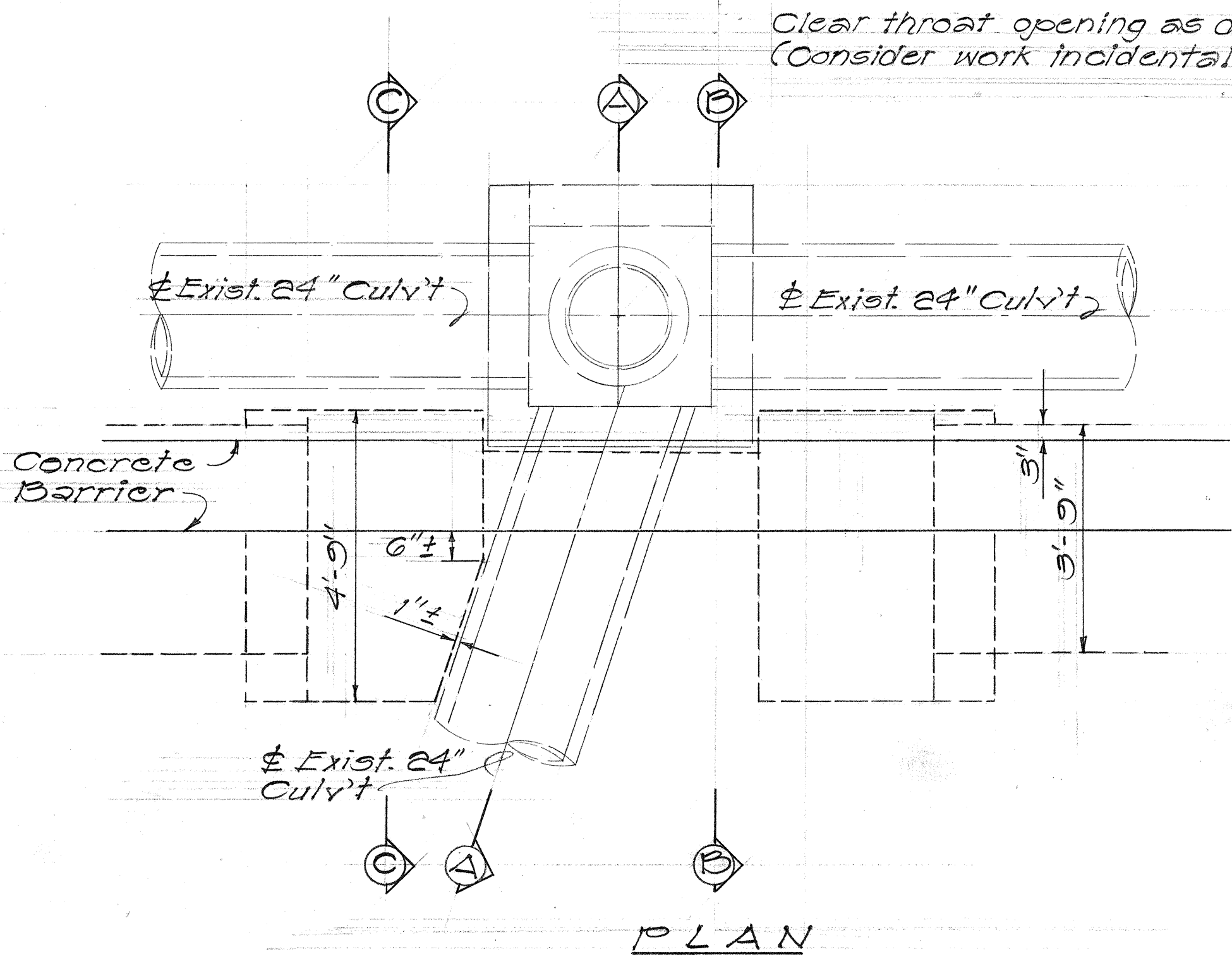


DATE	DESIGNED BY	CHECKED BY
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	66	181

GENERAL NOTES

- For added reinforcing steel details around manhole cover and culvert openings in walls and slabs, for C.B.'s, Grated Inlet & G.D.M.H. see sht. no. 33H
- Concrete for grated drop intakes and Catch Basins shall be Type Class "A".
- Except as noted or shown on plans, all C.I. frames and covers for existing manholes and catch basins which are to be partially or completely demolished shall be salvaged cleaned and returned to 727 Koko Street, Honolulu, Hawaii, 96819.
- Typical concrete barrier details are shown in the roadway section; except, concrete barrier details over or at the immediate vicinity of drainage structures are shown in the drainage section.
- Roofing paper (55#) and premolded joint filler as indicated on plans, shall be considered incidental to Class "A" Concrete.
- For payment limits of concrete barrier over C.B.'s and Grated Inlets, see sht. no. 33H



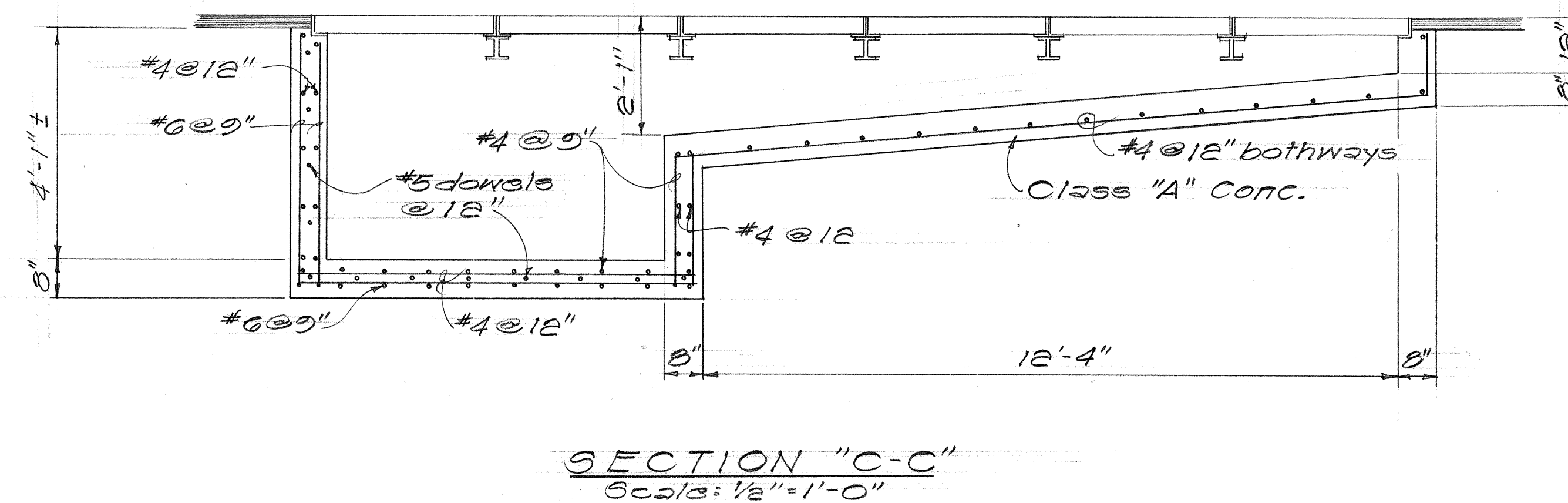
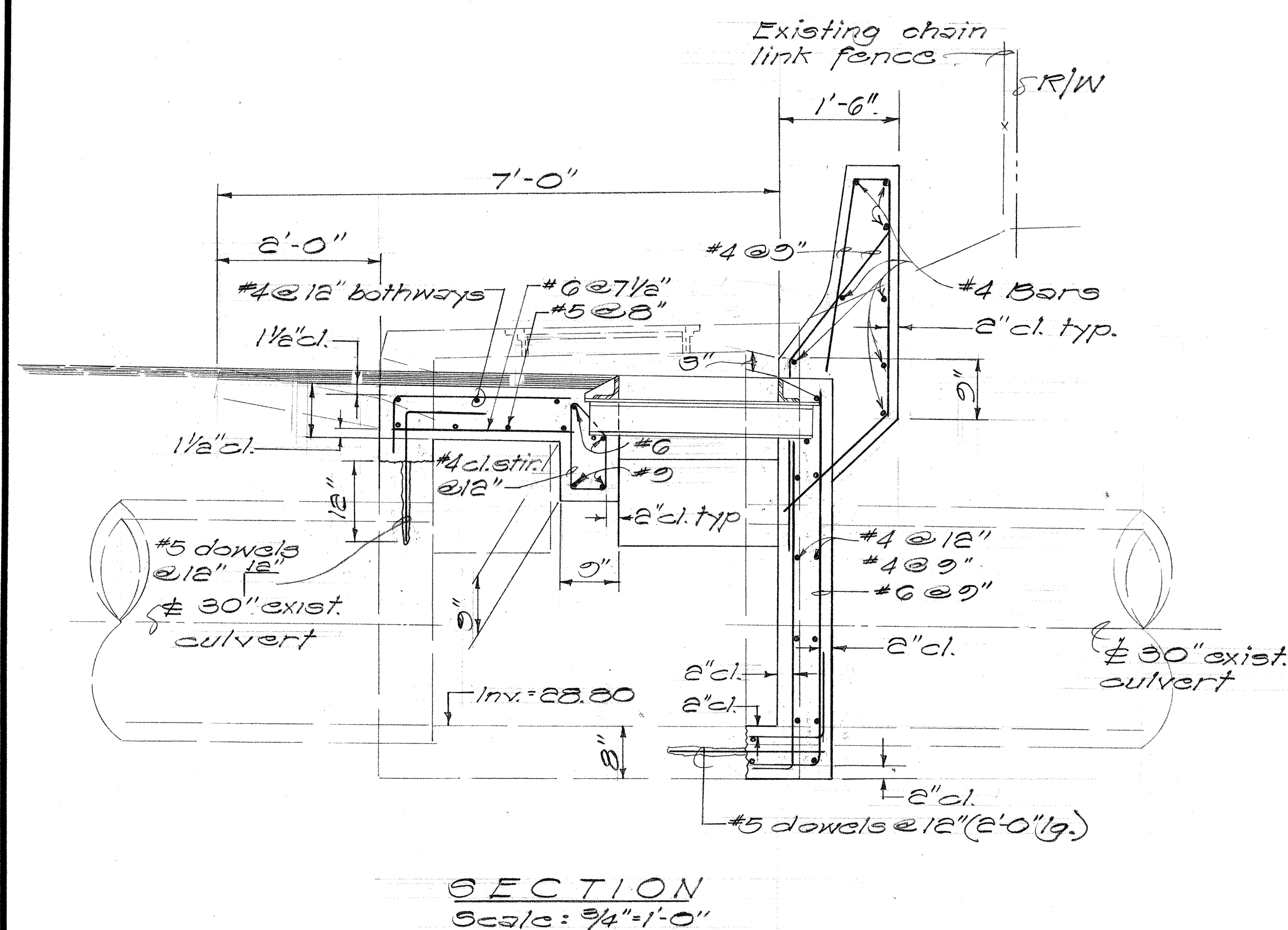
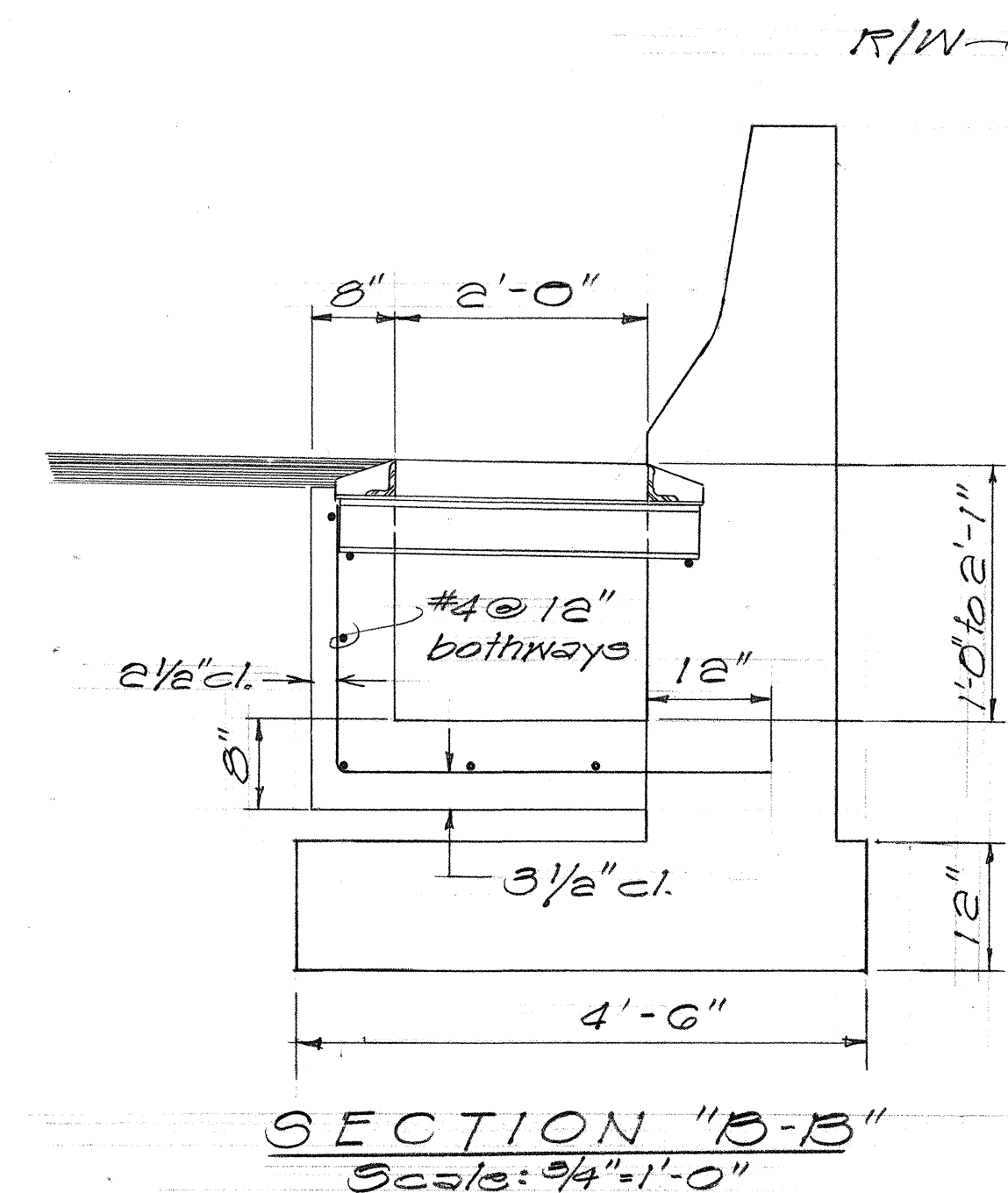
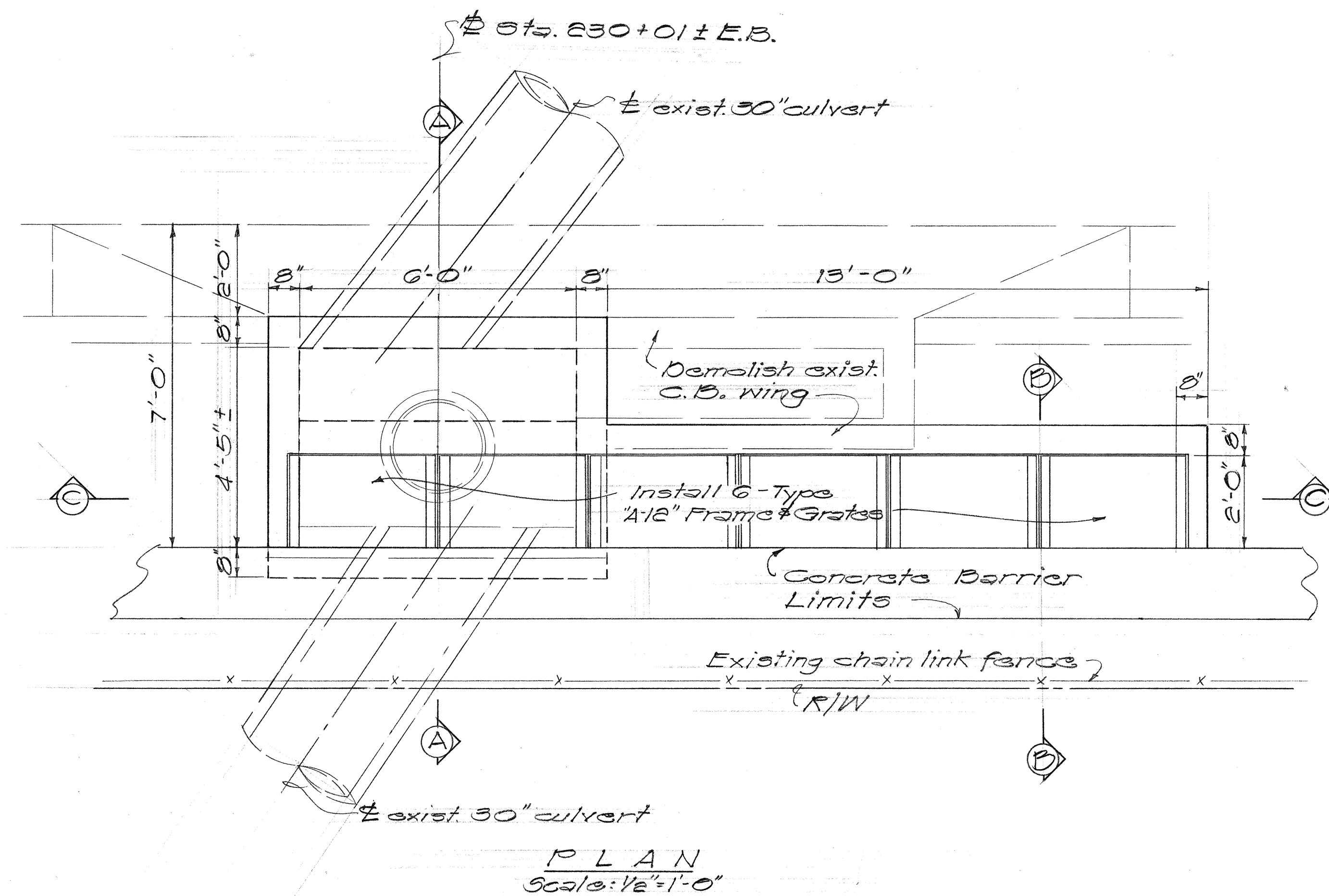
C.I.B. #2 AT STA. 230 + 21.80 W.B.
Scale: 1/2" = 1'-0"

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

FA-1 Proj. No. I-HI-1(60):23
Scale: As Shown Date: Aug., 1976
SHEET No. 4H OF 414 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1(60):23	1976	67	181

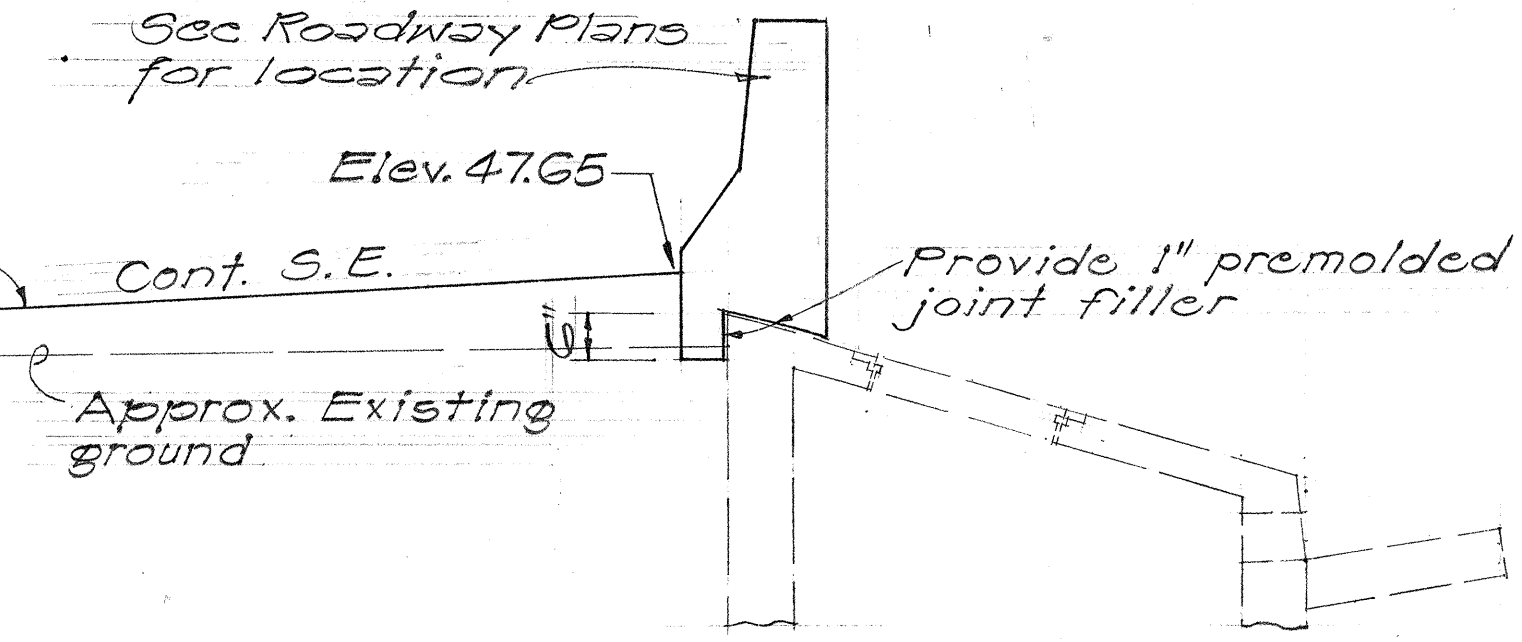
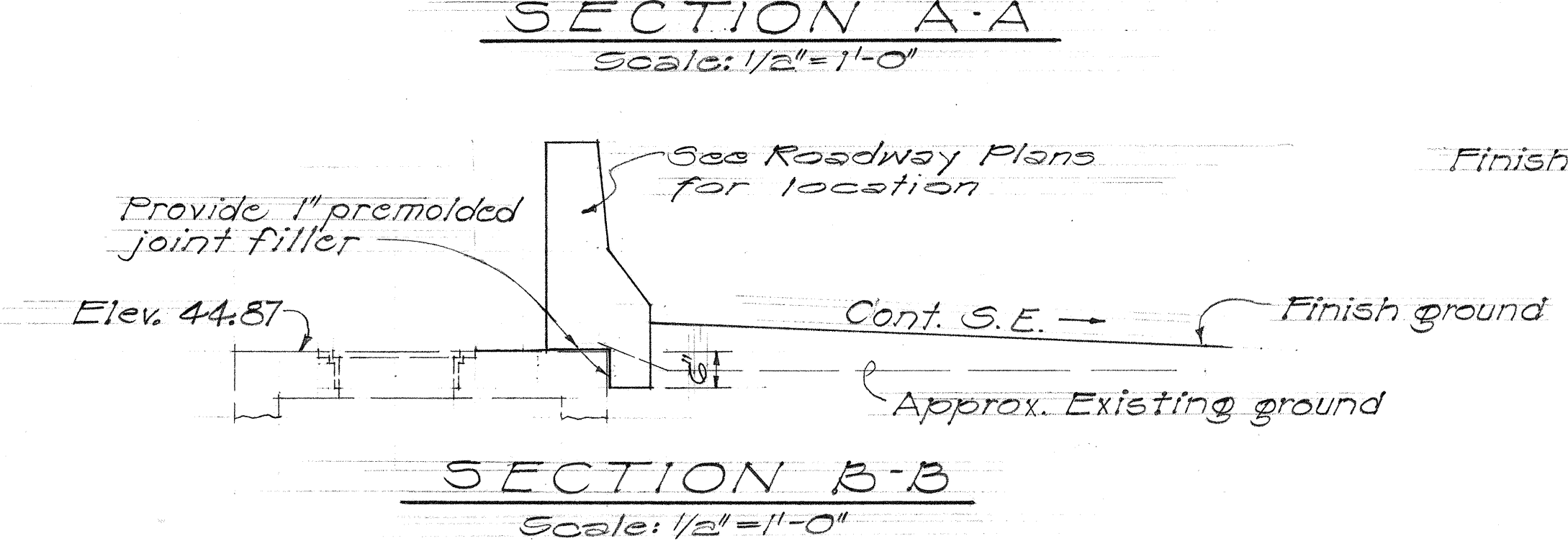
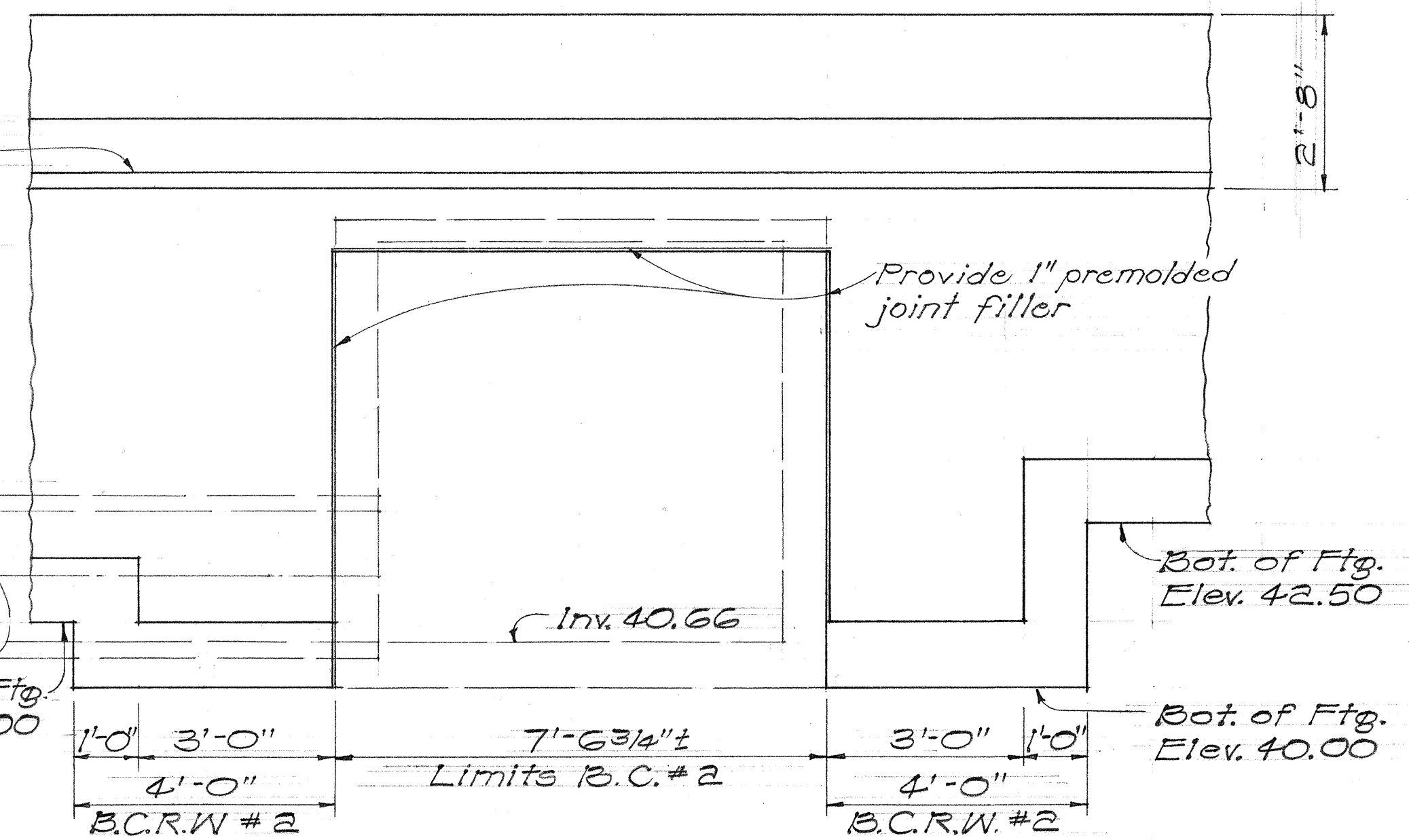
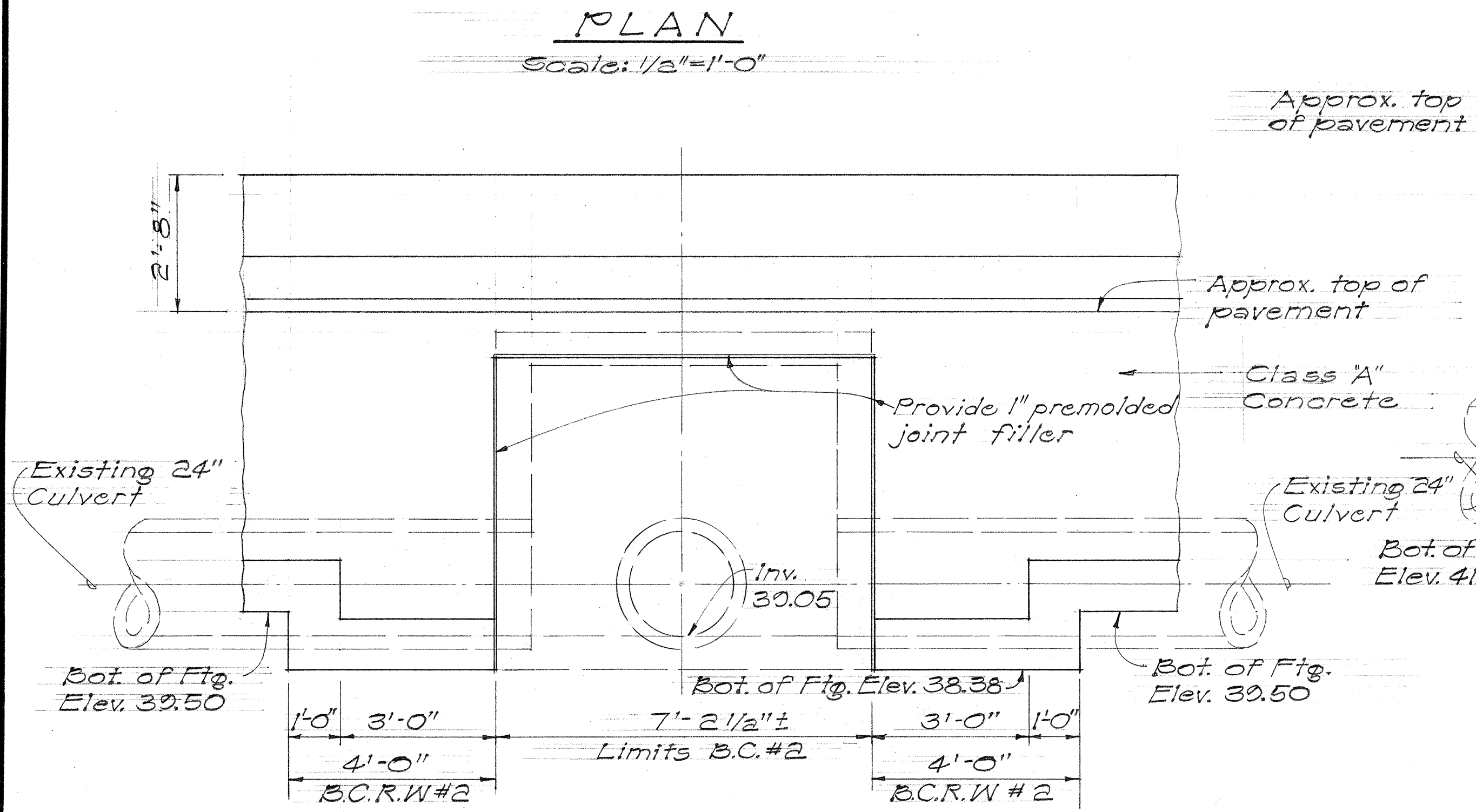
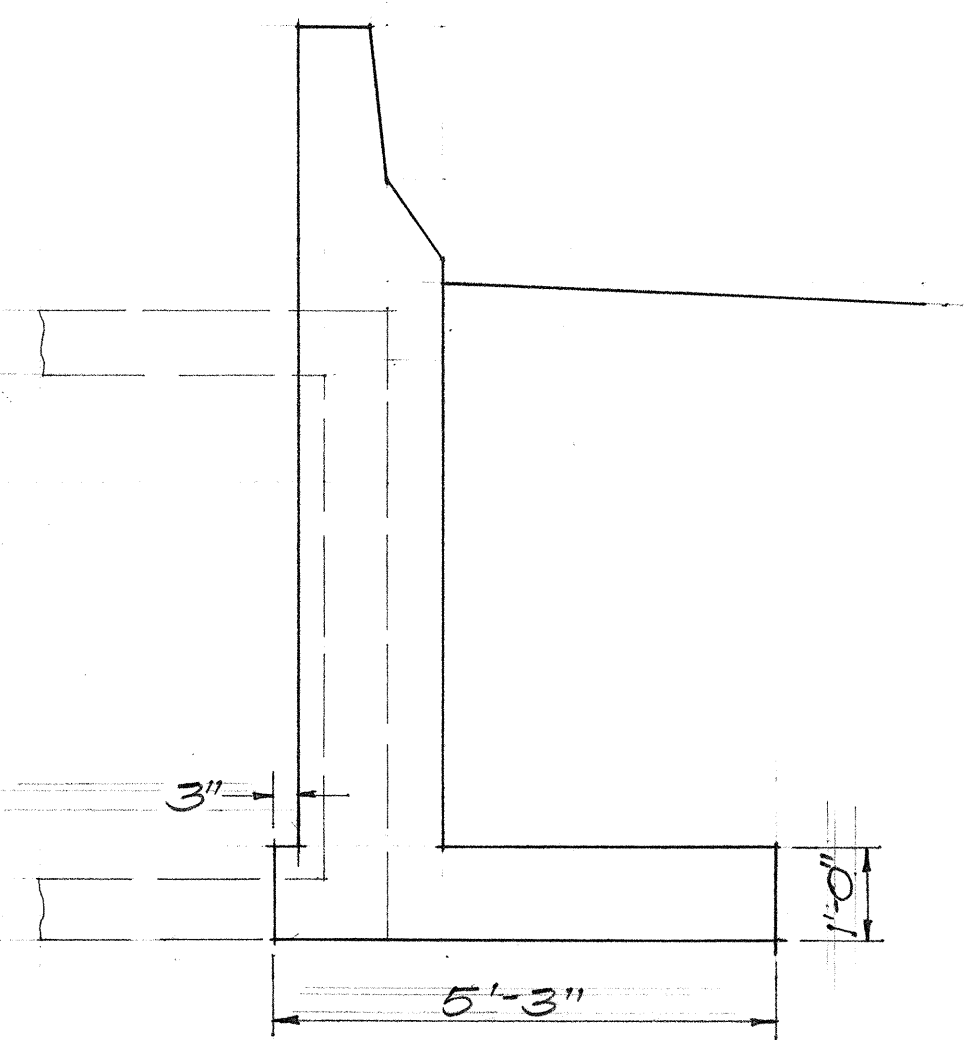
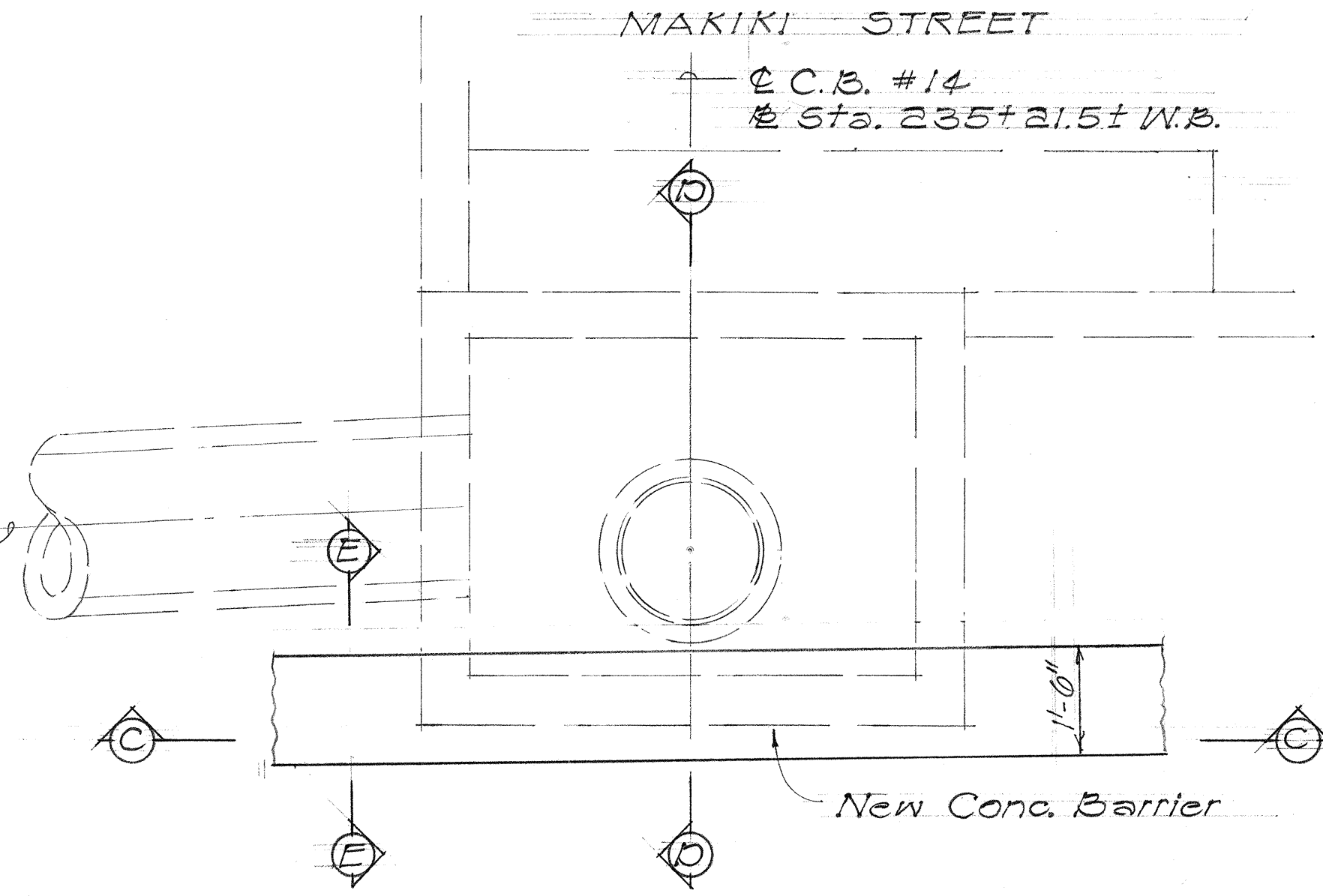
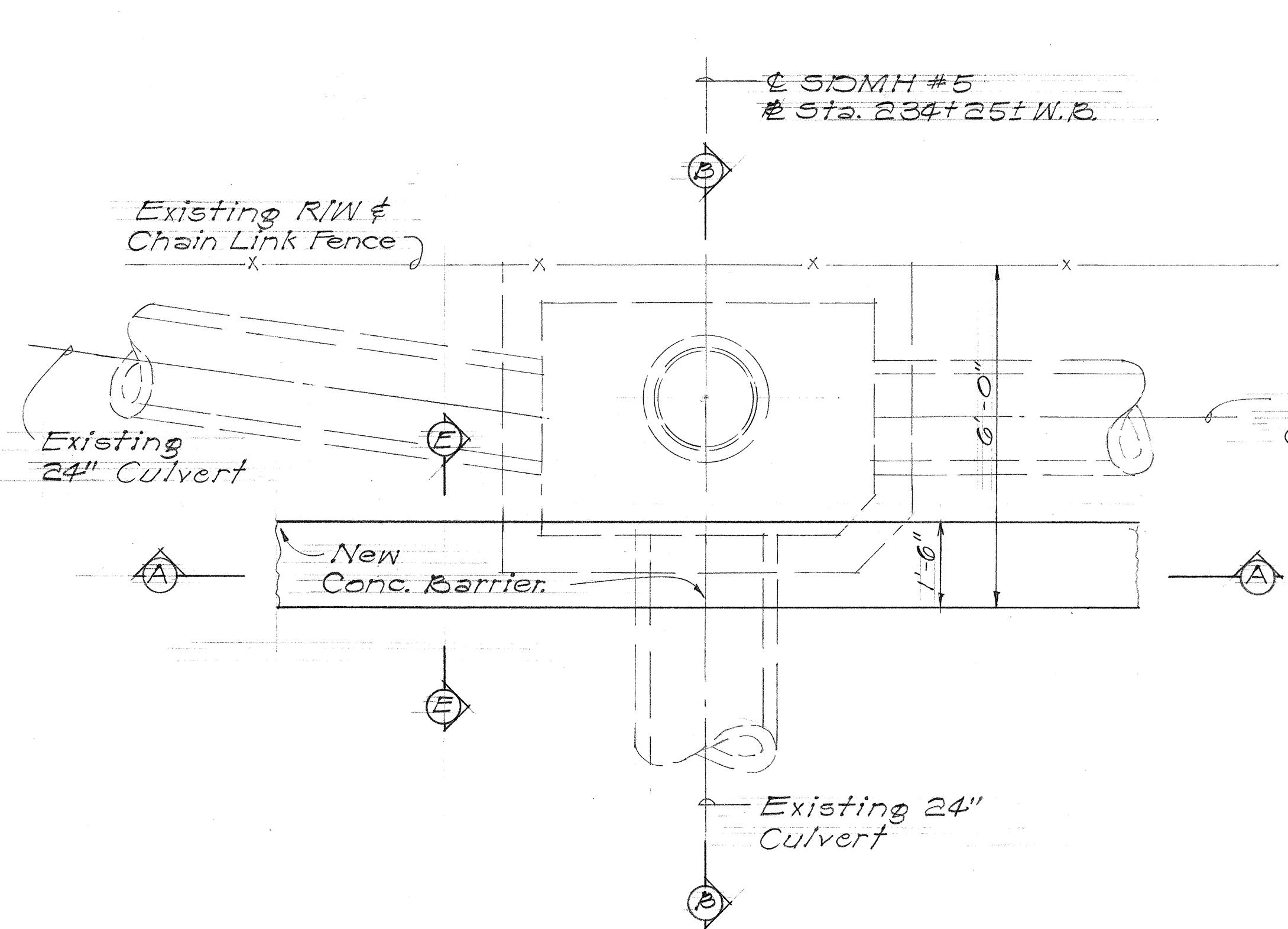


GRATED INLET @ STA. 230+01 ± E.B.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-H-1(60):23
Scale: As Shown Date: Aug. 1976
SHEET NO. 54 OF 414 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-(60):23	1976	68	181



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

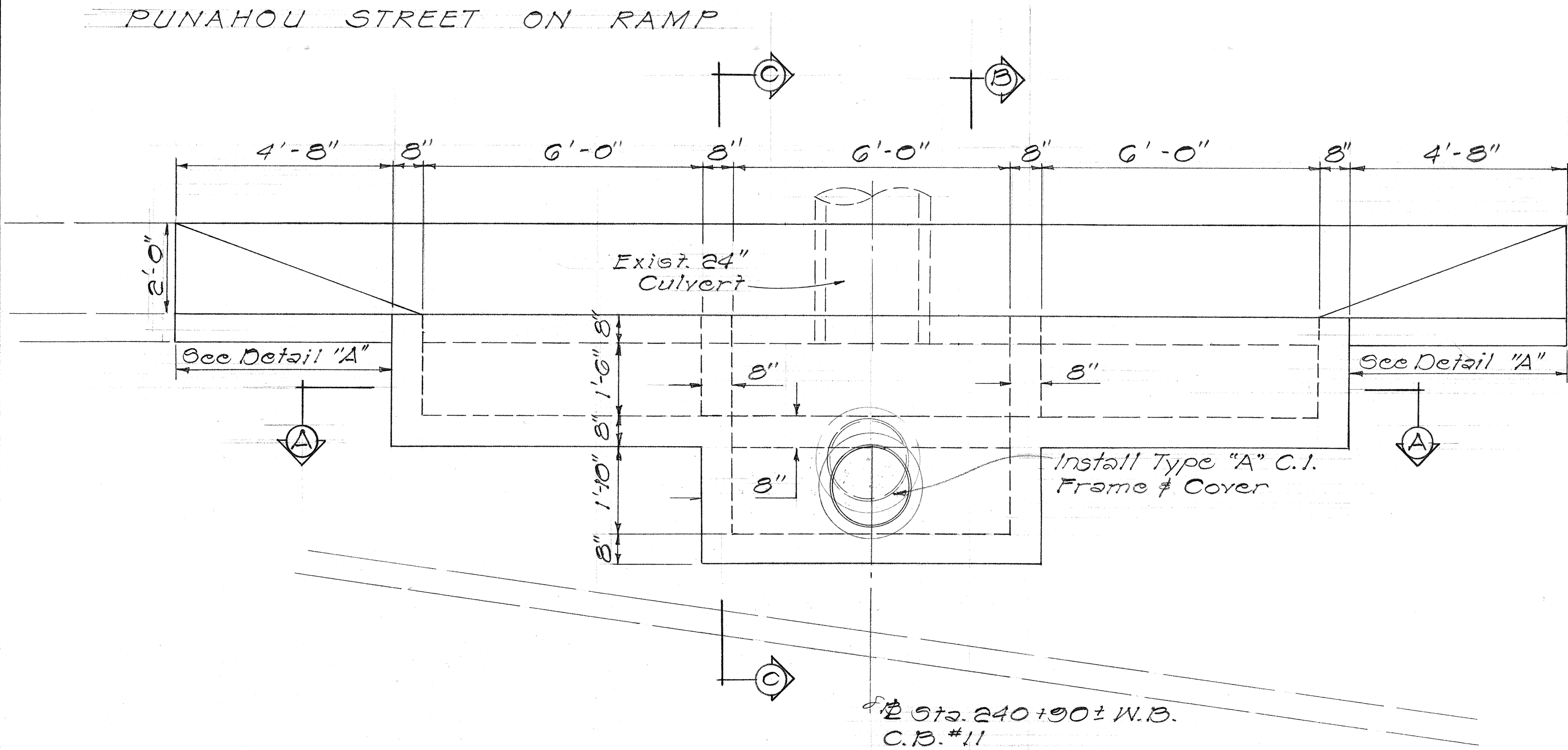
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-(60):23
Scale: As Shown Date: Aug. 1976
SHEET No. 68 OF 414 SHEETS

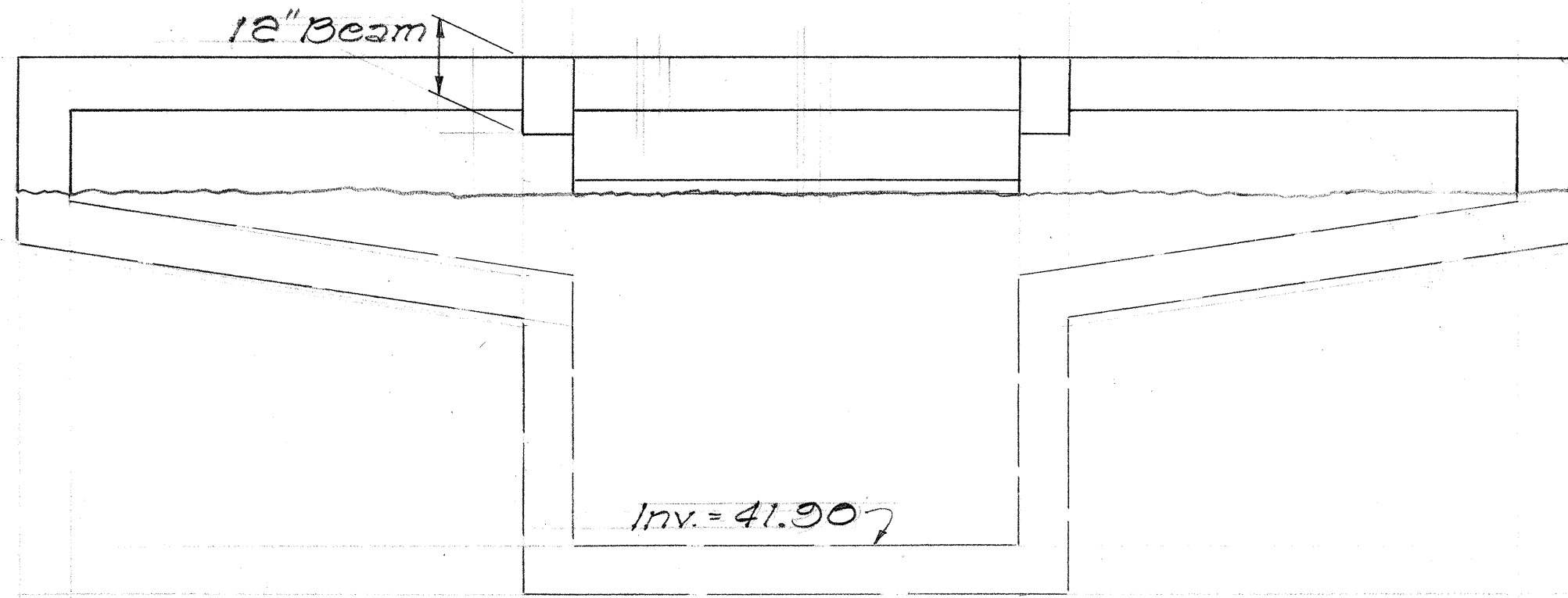
SURVEY PLOTTED BY	DATE
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QUANTITIES BY	
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ORIGINAL PLAN	
NOTE BOOK	
No.	

S.D.M.H. @ STA. 234+25± W.B. AND C.B. @ STA. 235+21.5 W.B.

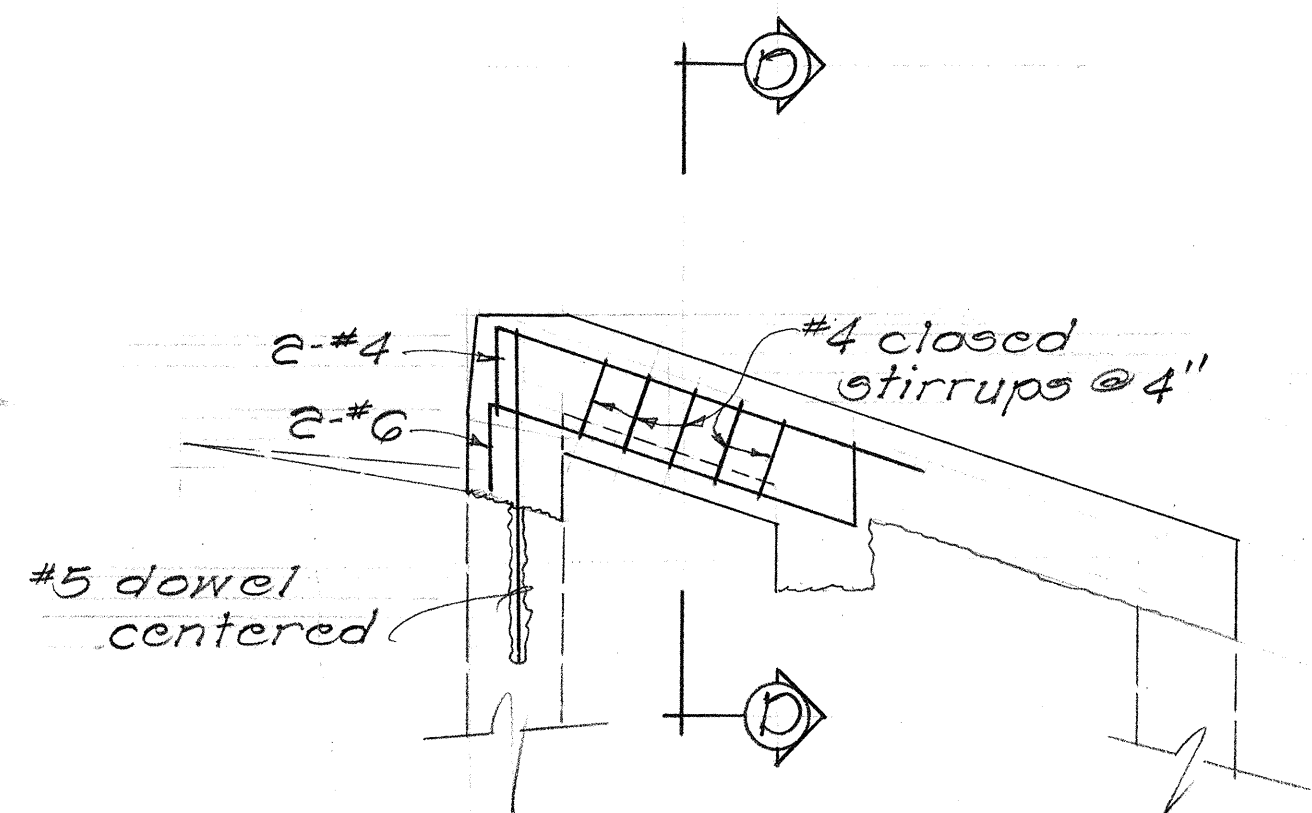
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60)23	1976	69	181



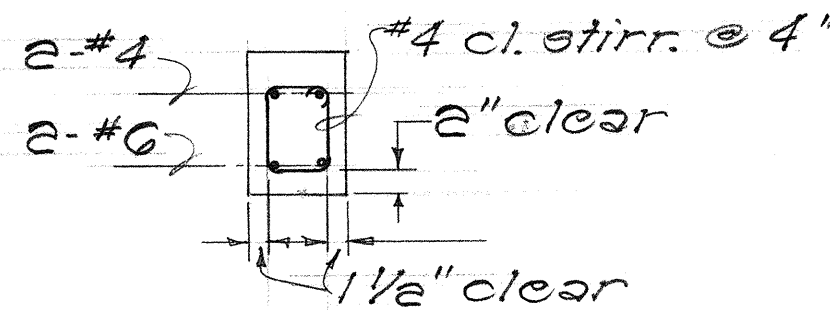
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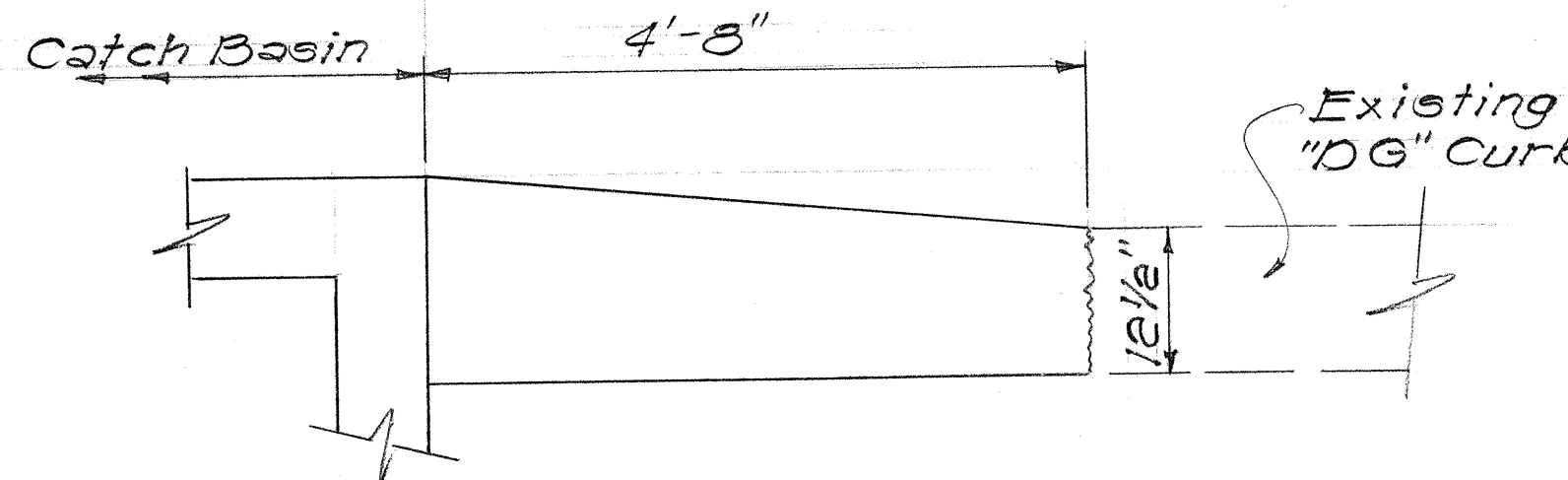
SECTION "A-A"
Scale: 1/2"=1'-0"



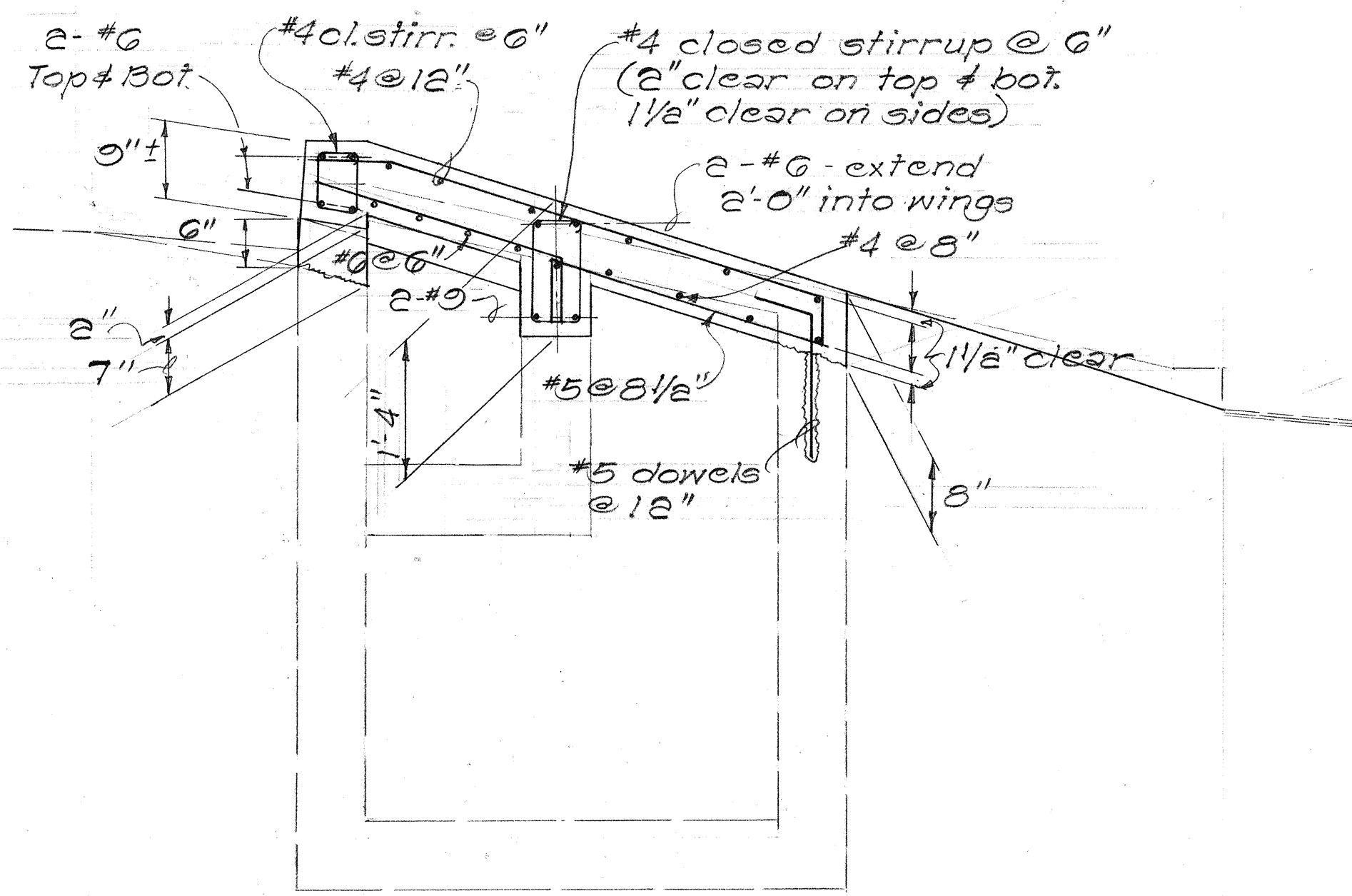
SECTION "C-C"
TYPICAL 12" BEAM REINFORCING
Scale: 3/4"=1'-0"



SECTION "D-D"



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



SECTION "B-B"
TYPICAL SLAB REINFORCING
Scale: 3/4"=1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

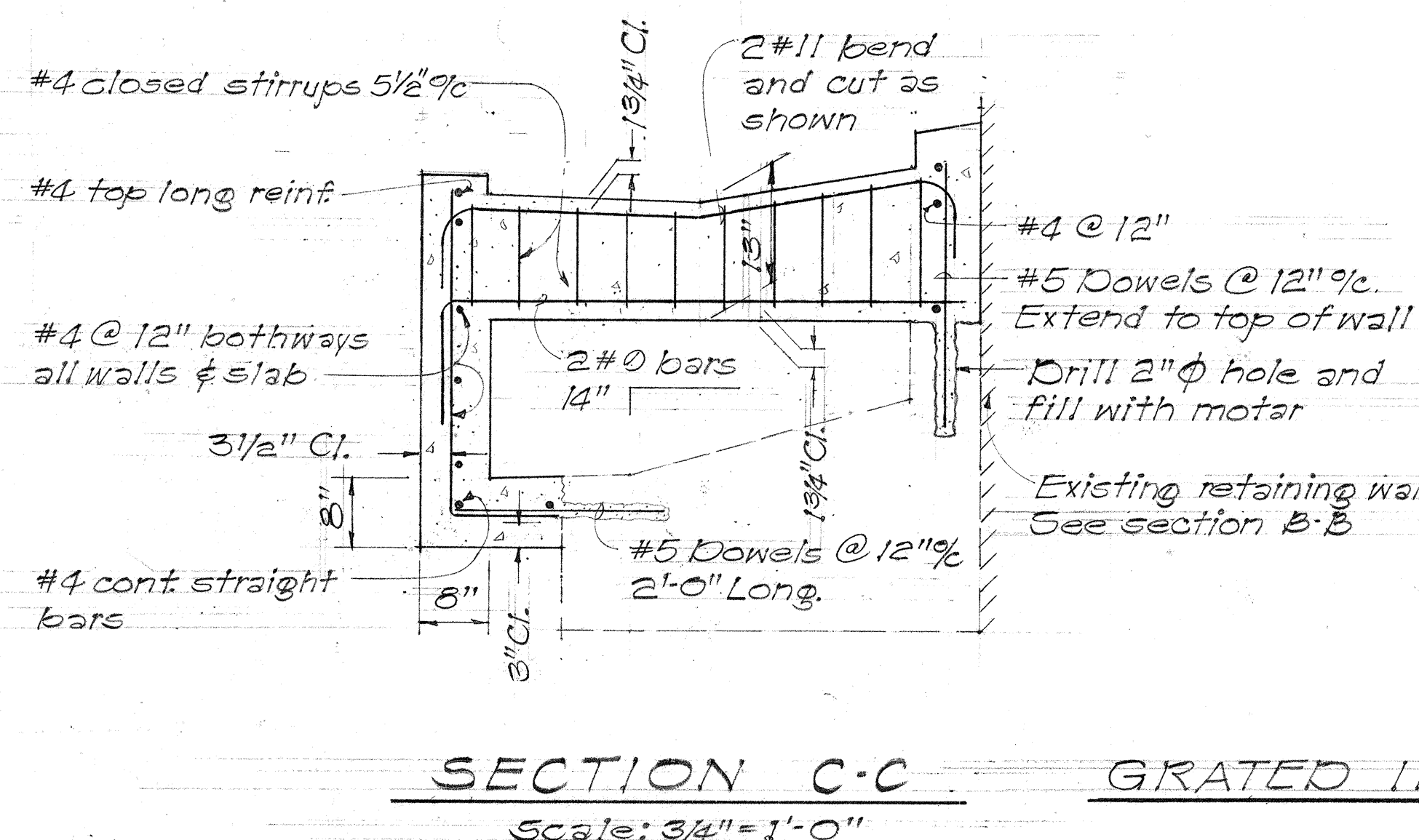
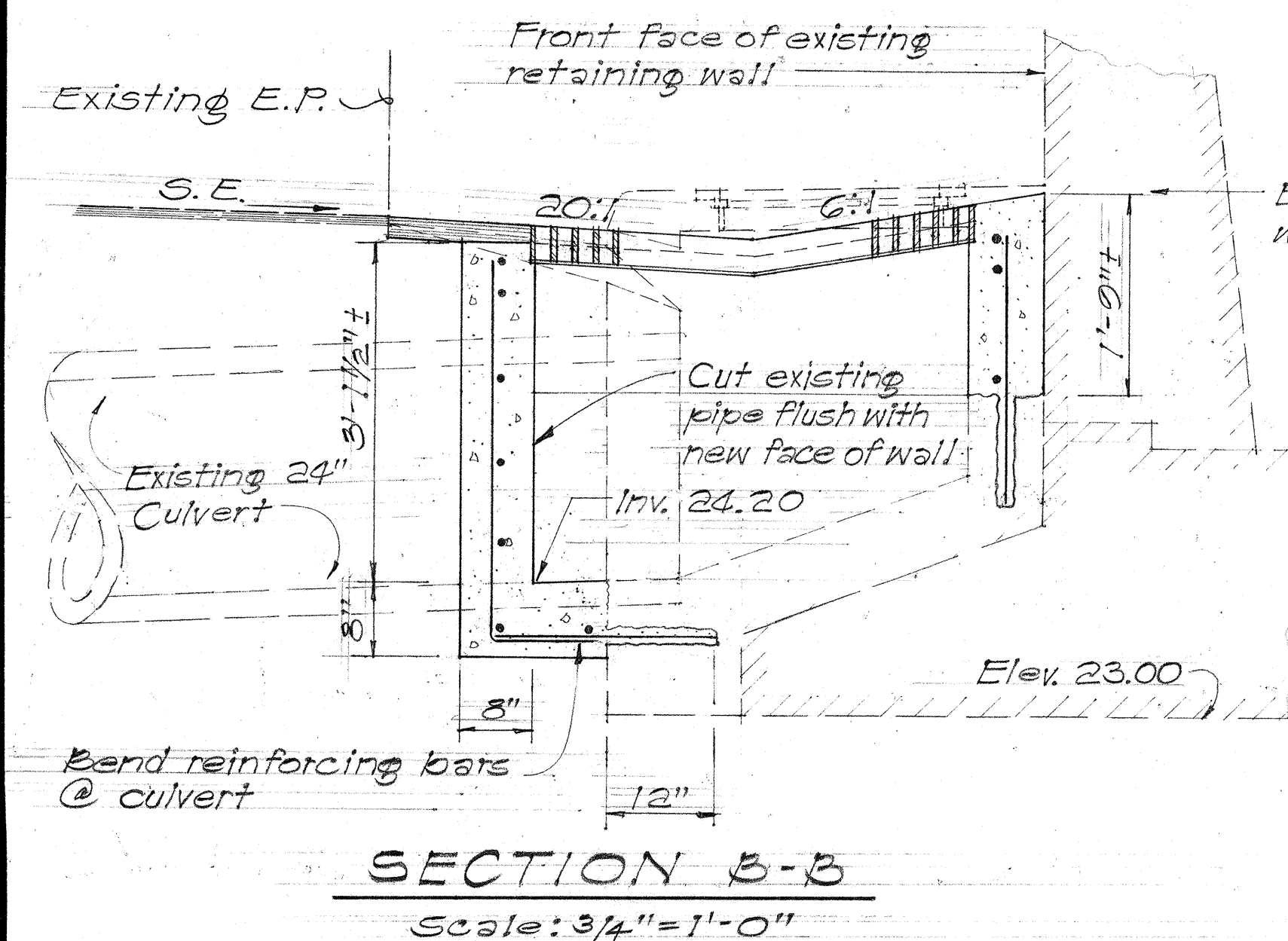
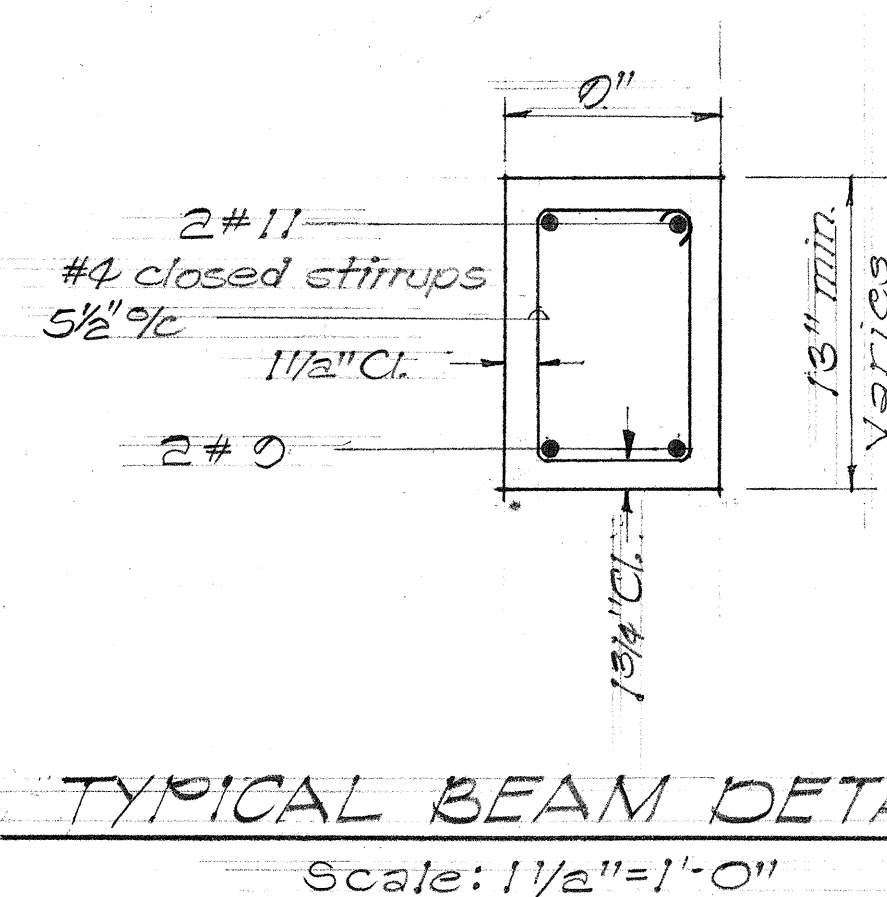
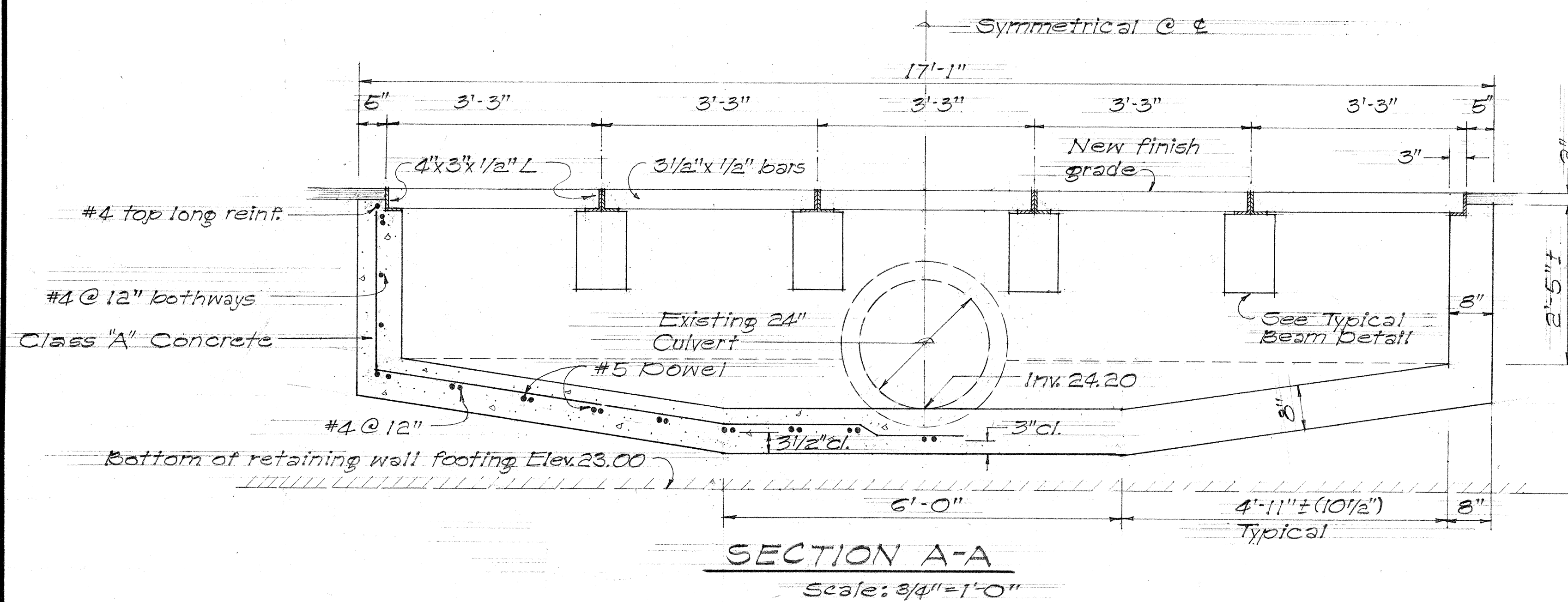
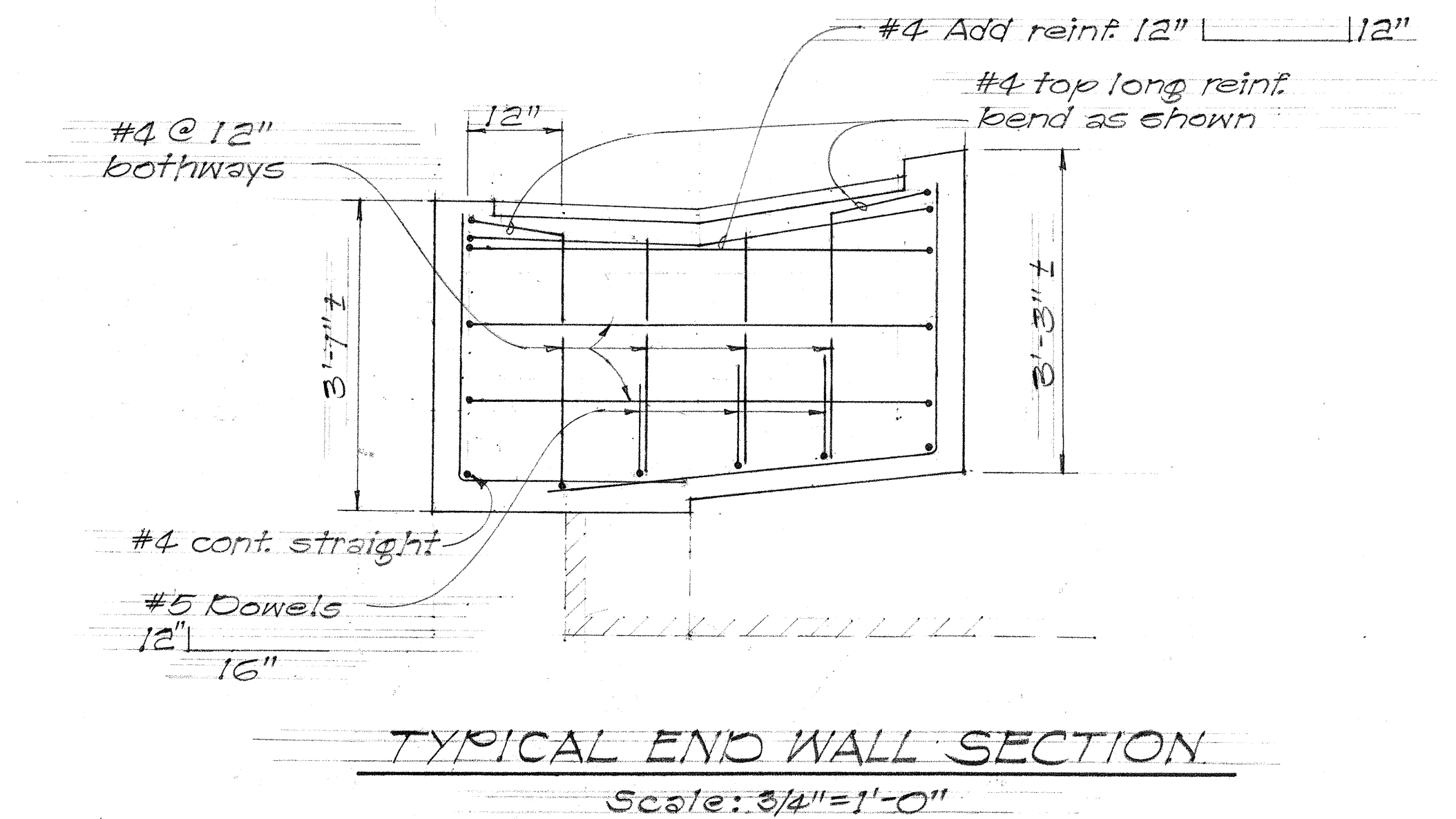
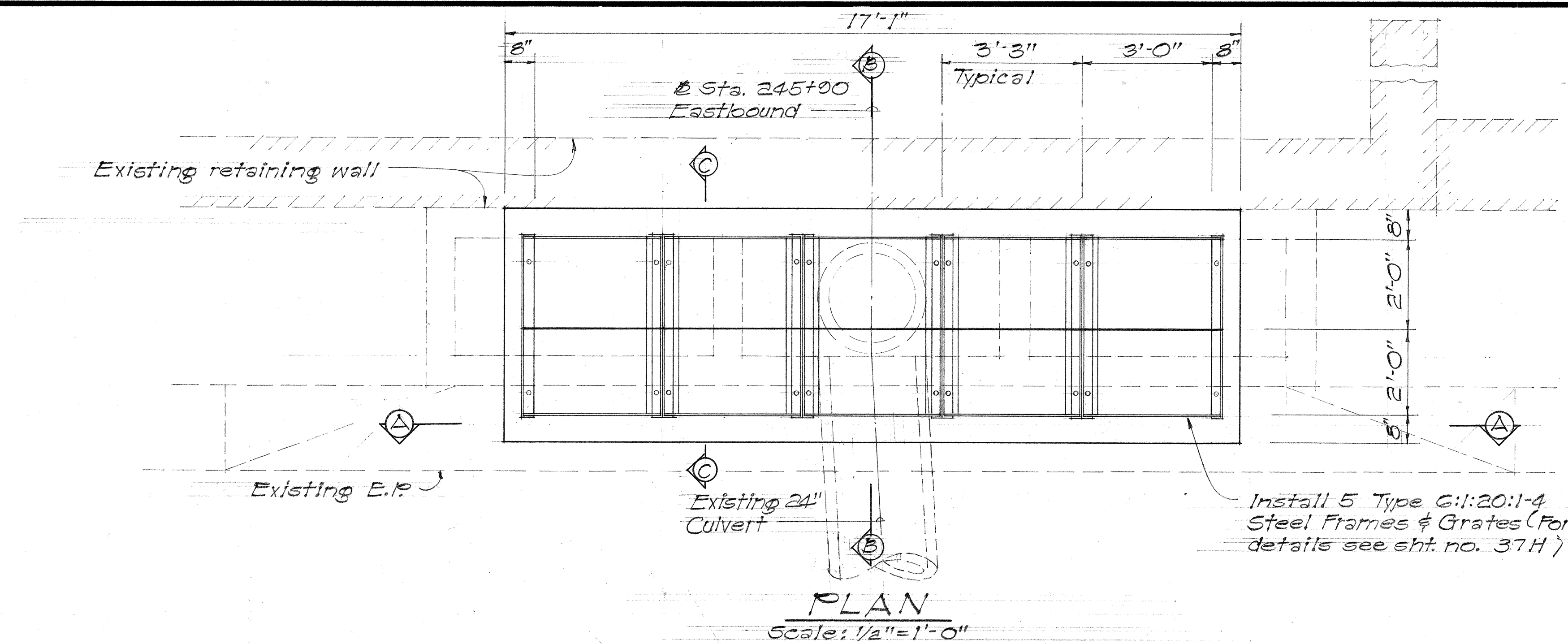
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60)23
Scale: As Shown Date: Aug. 1976
SHEET NO. 7 H OF 41 H SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

C.B. @ STA. 240+00 ± W.B.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	70	181



GRADED INLET @ STA. 245+00± E.B.

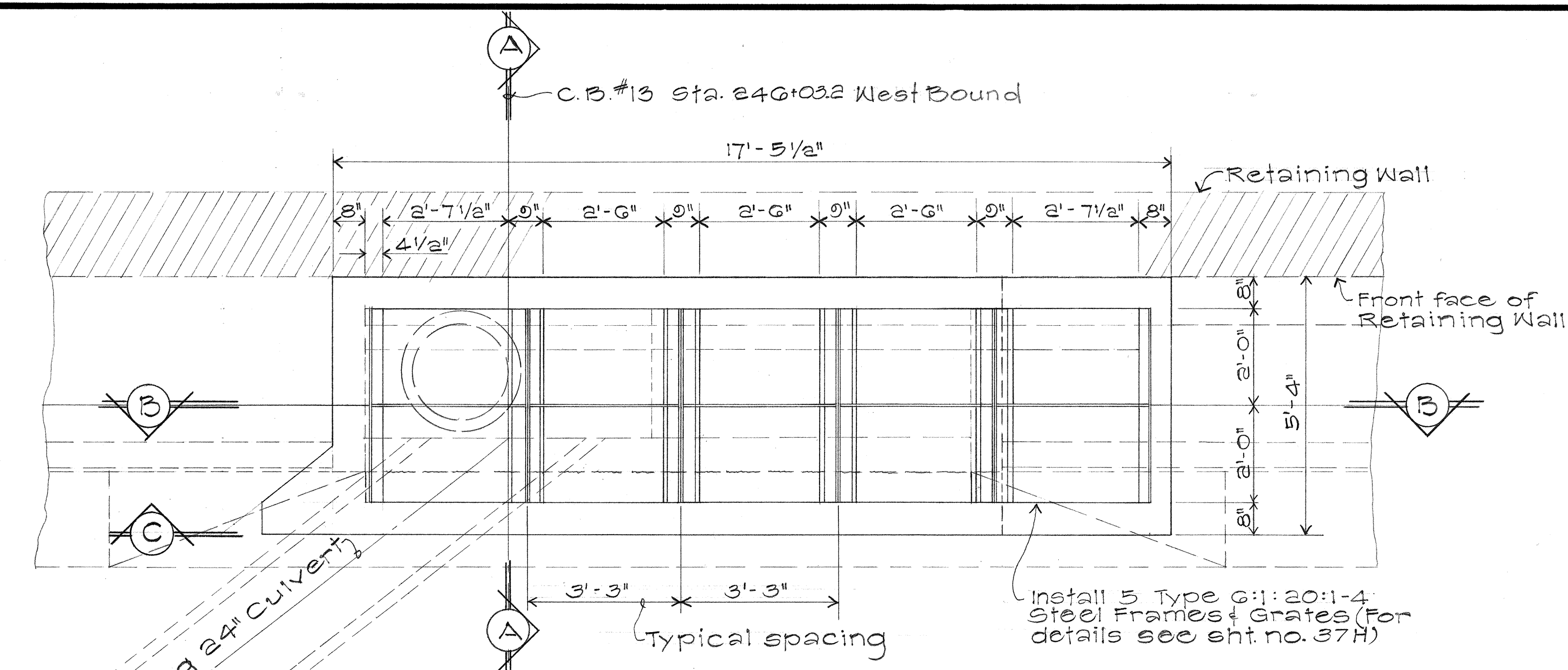
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60):23

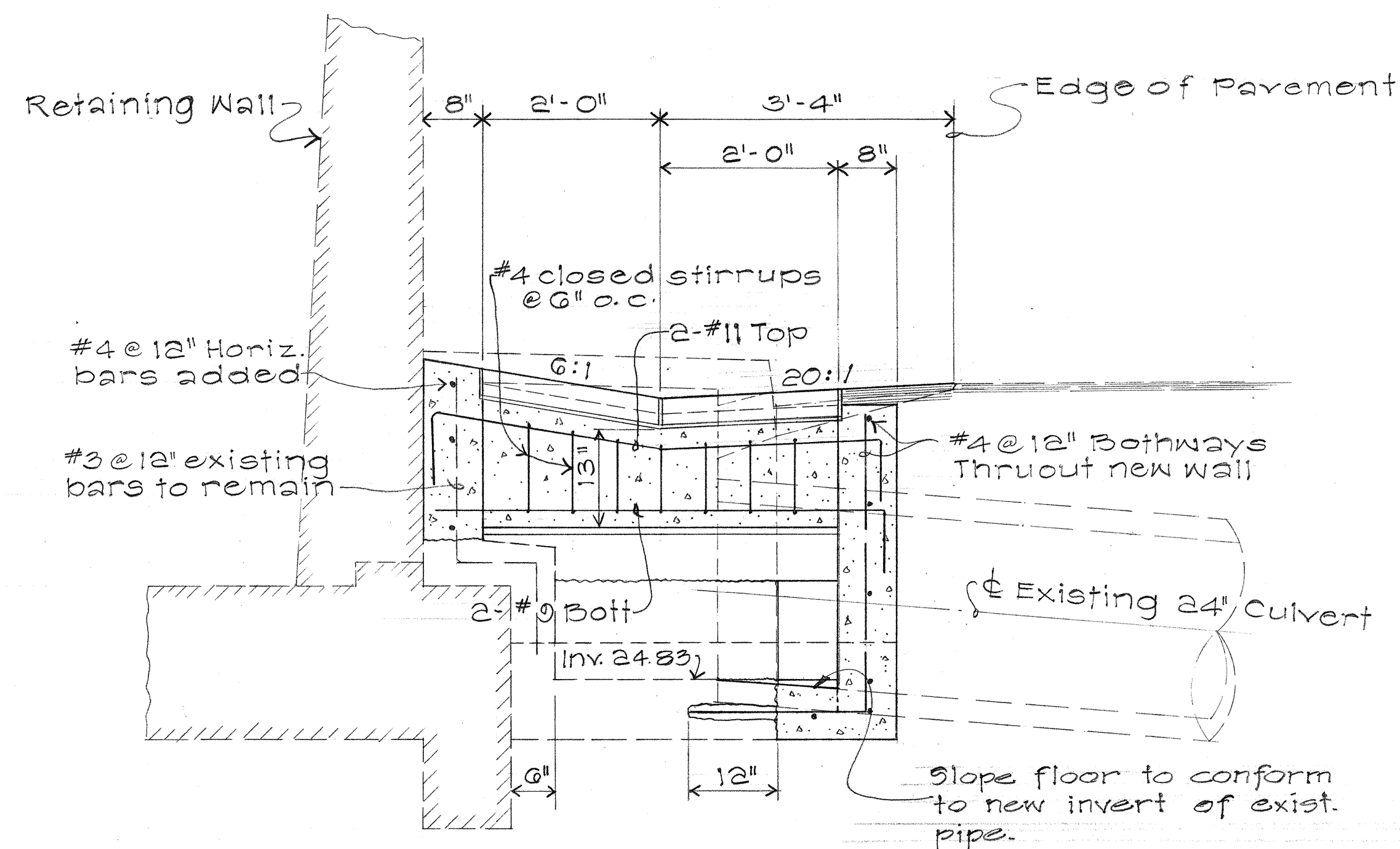
Scale: As Shown Date: Aug. 1976

SHEET No. 24 OF 118 SHEETS

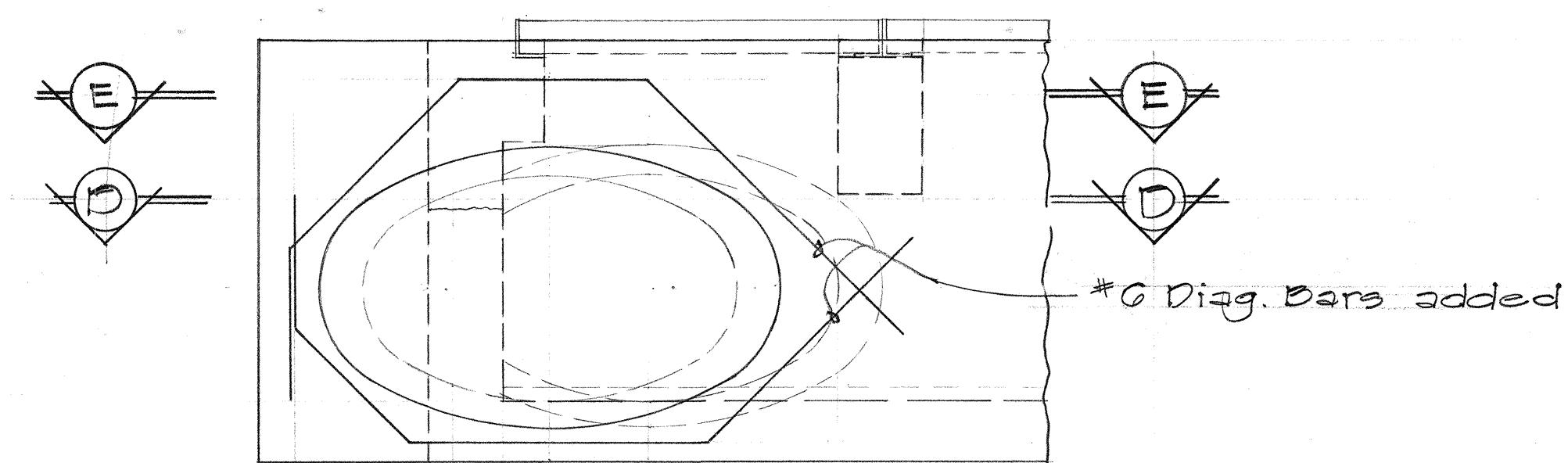
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	71	181



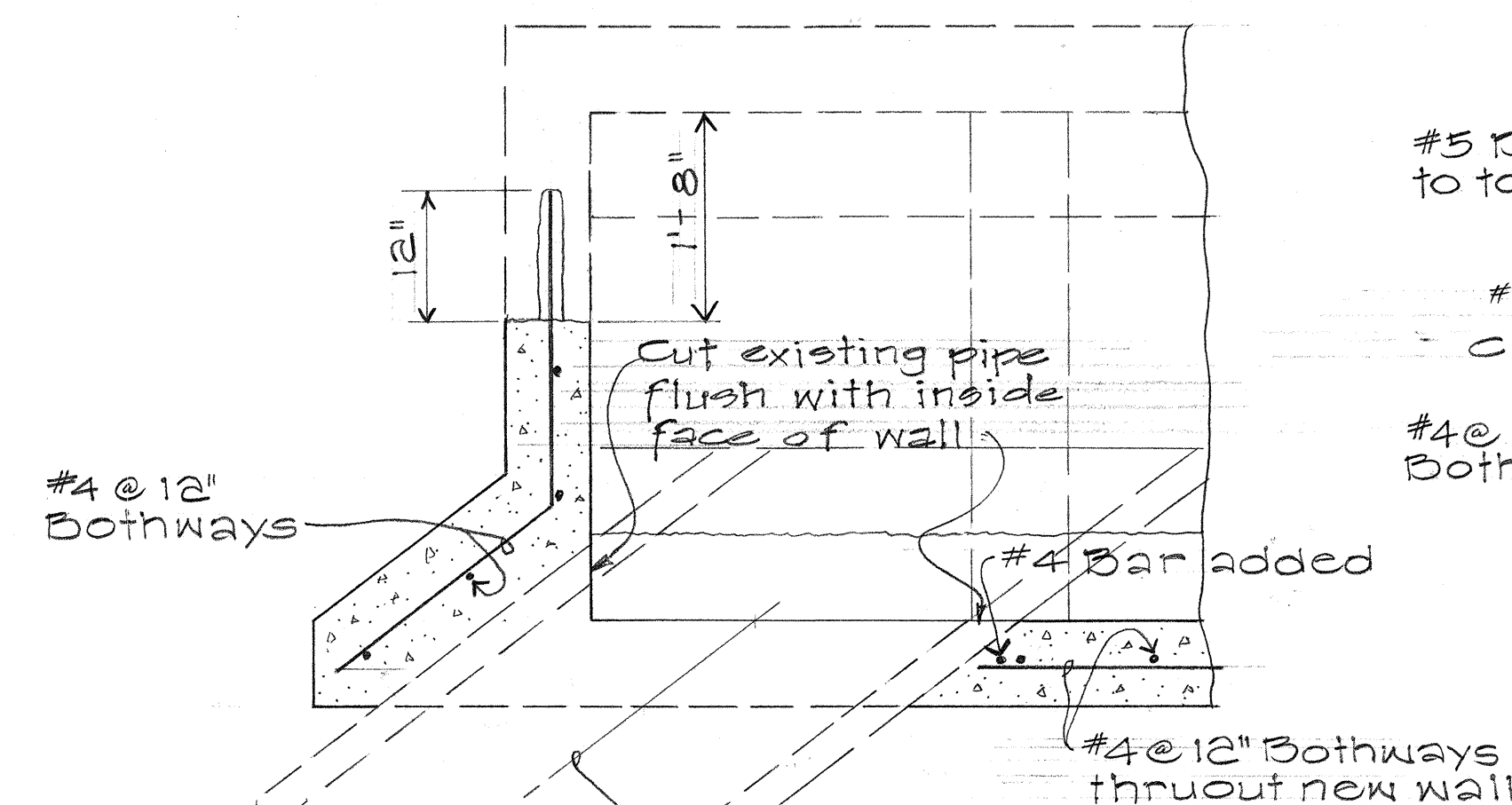
PLAN
Scale: 1/2" = 1'-0"



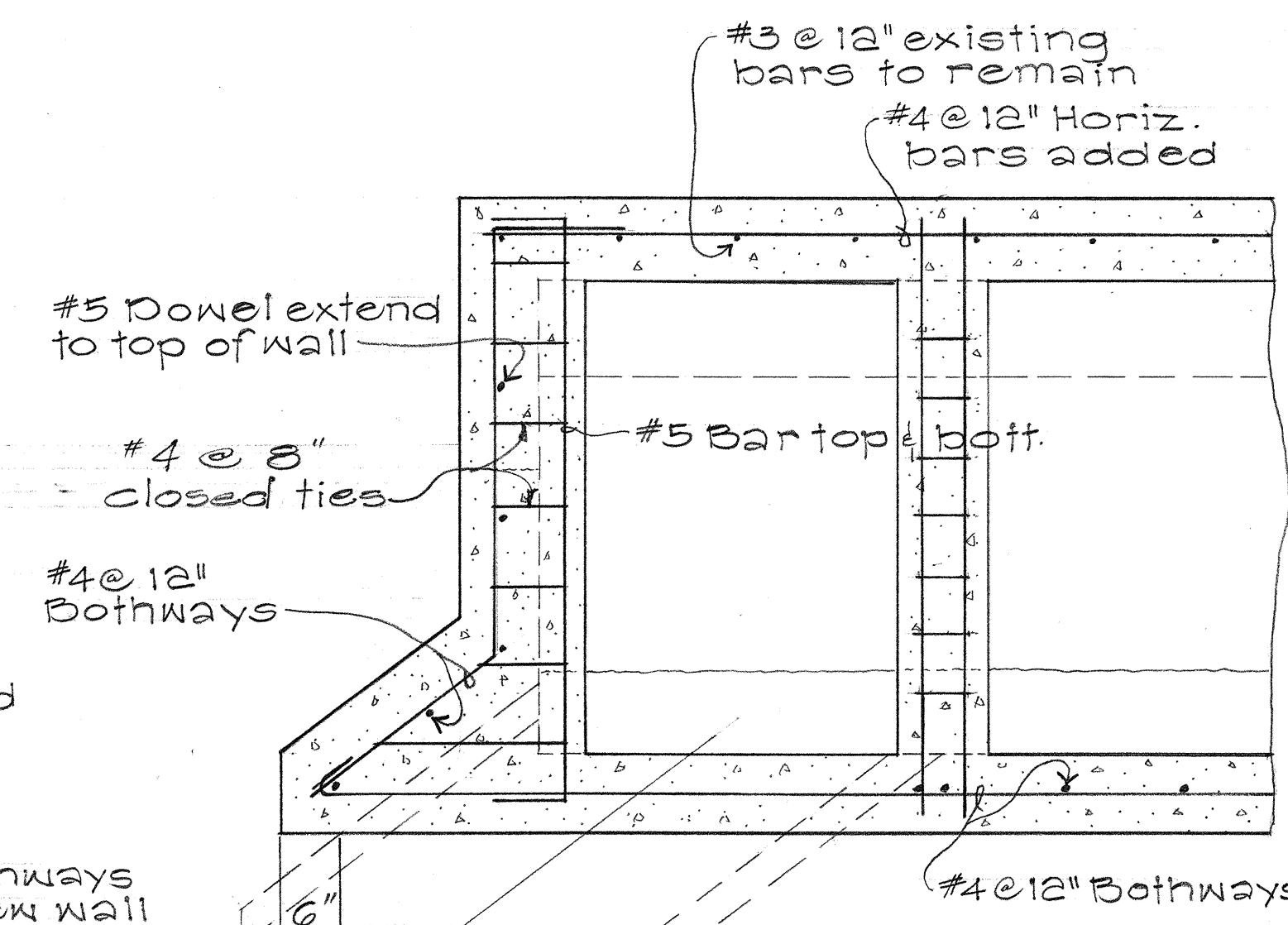
SECTION "A-A"
Scale: 3/4" = 1'-0"



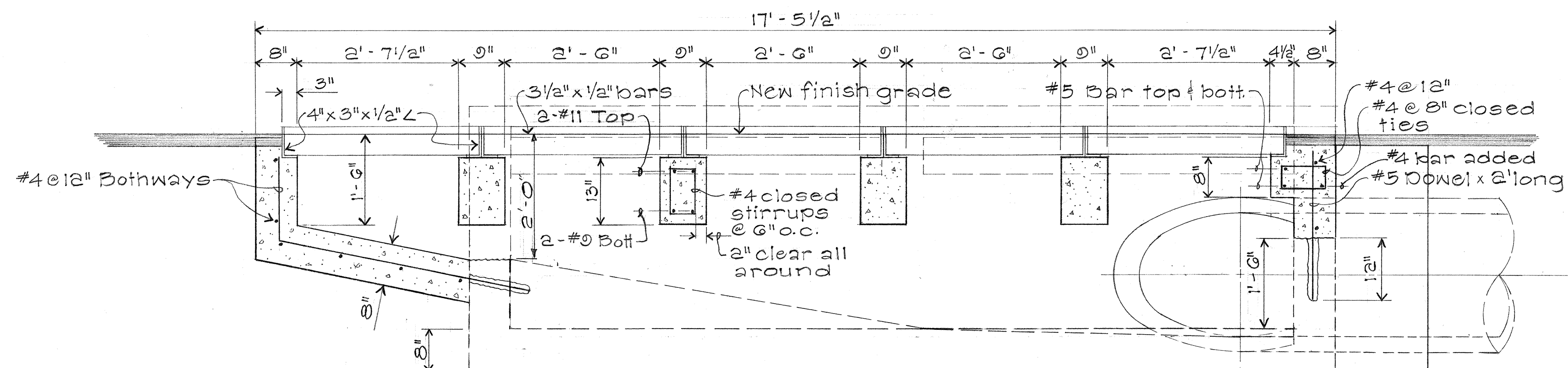
SECTION "C"
Scale: 3/4" = 1'-0"



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



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



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

GRATED INLET AT STA. 246+03 W.B.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

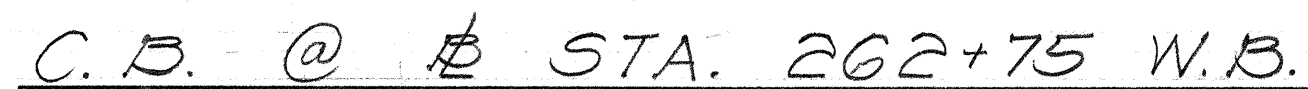
F.A.I. Proj. No. I-HI-1(60):23

Scale: As Shown Date: Aug. 1976

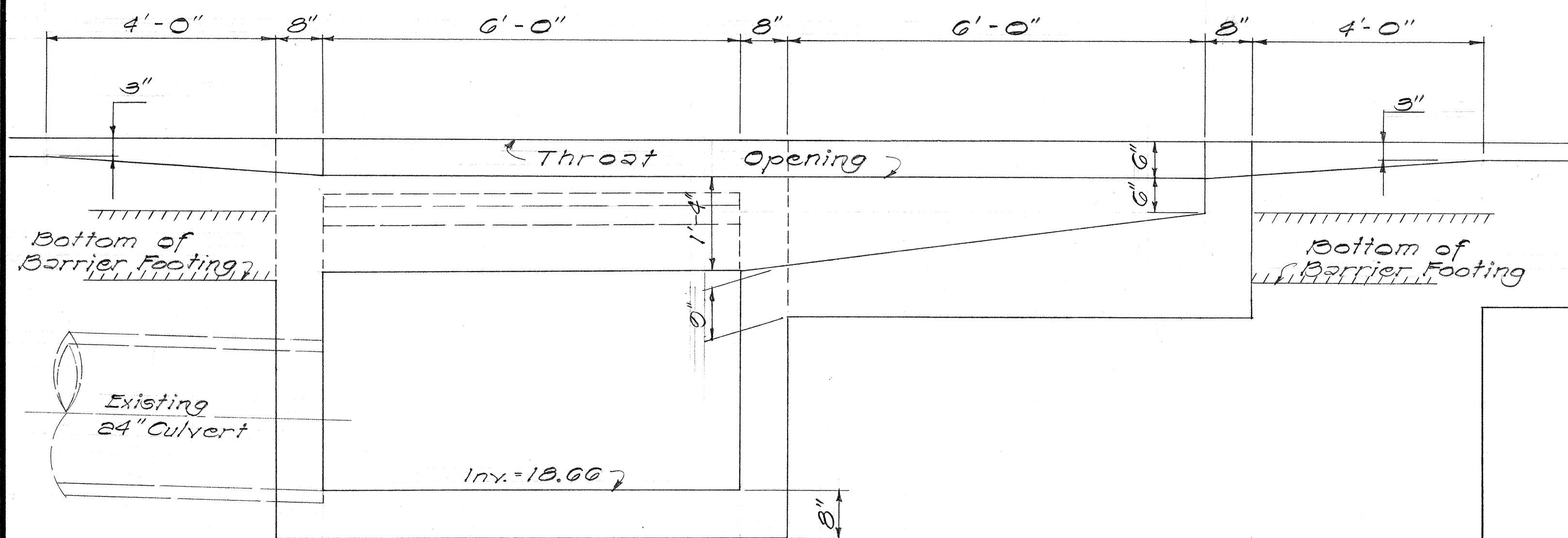
SHEET No. 24 OF 411 SHEETS

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
QUANTITIES BY	
CHECKED BY	

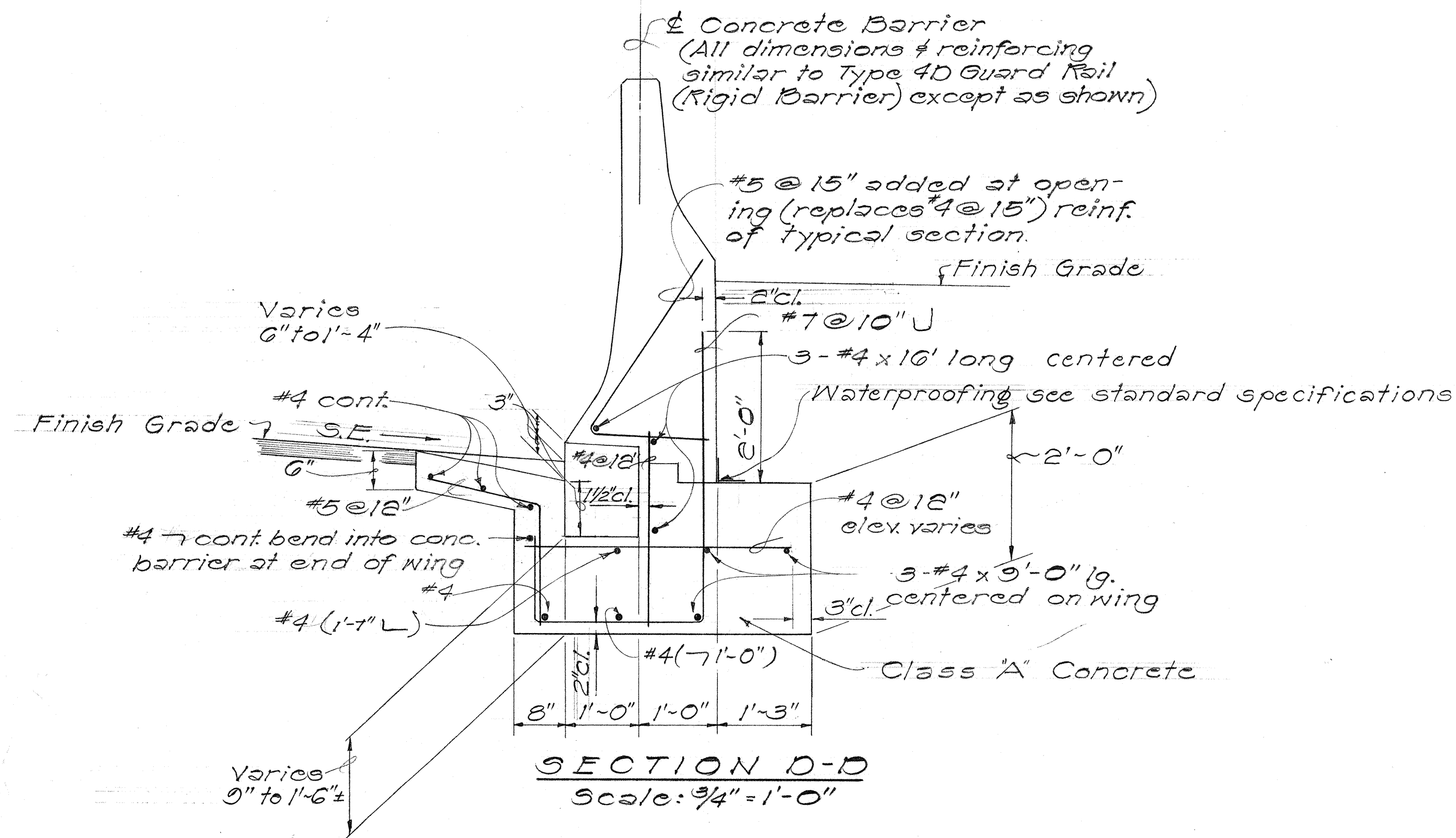
ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
NOTE BOOK	DRAWN BY _____	_____
	TRACED BY _____	_____
	DESIGNED BY _____	_____
	QUANTITIES BY _____	_____
No. _____	CHECKED BY _____	_____



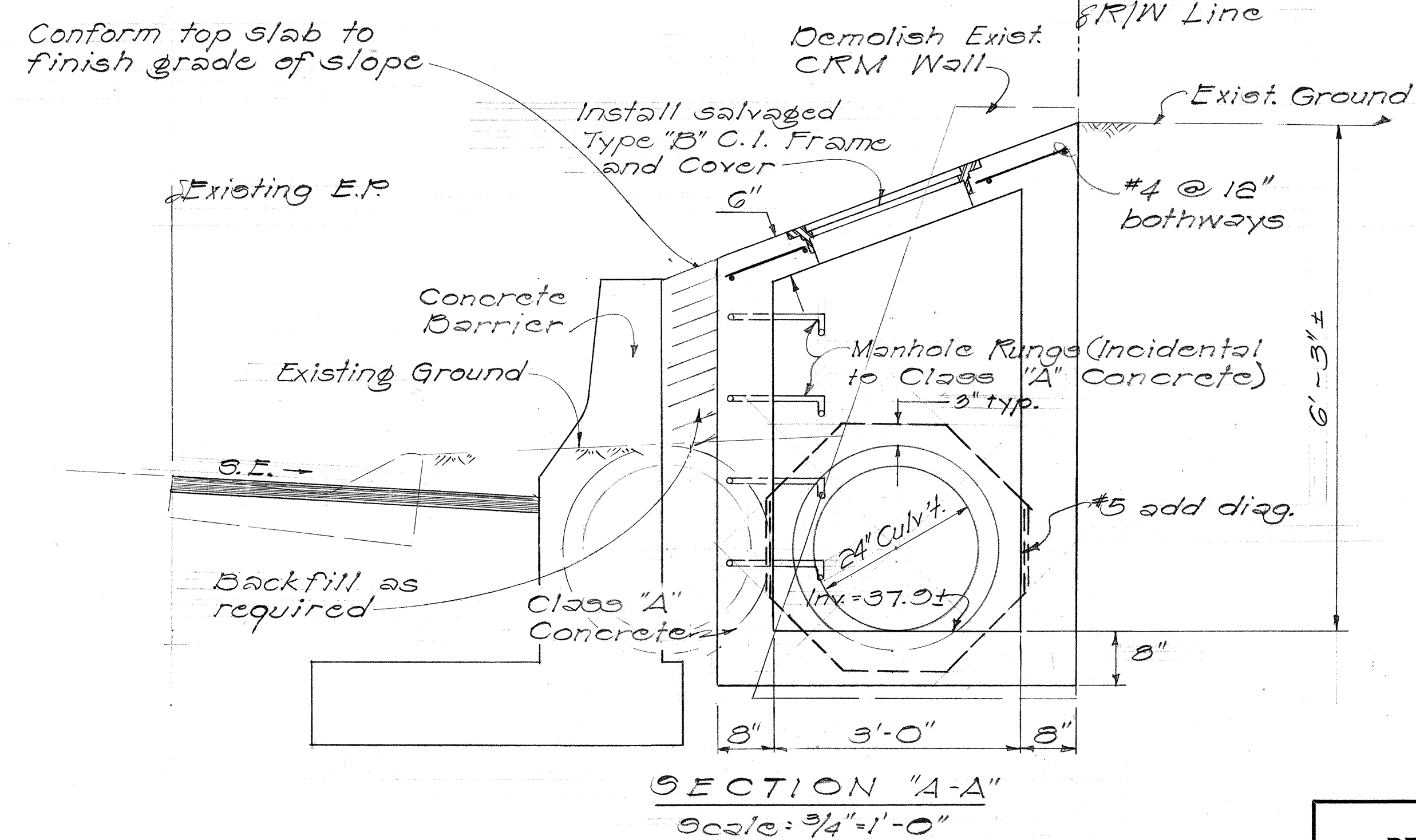
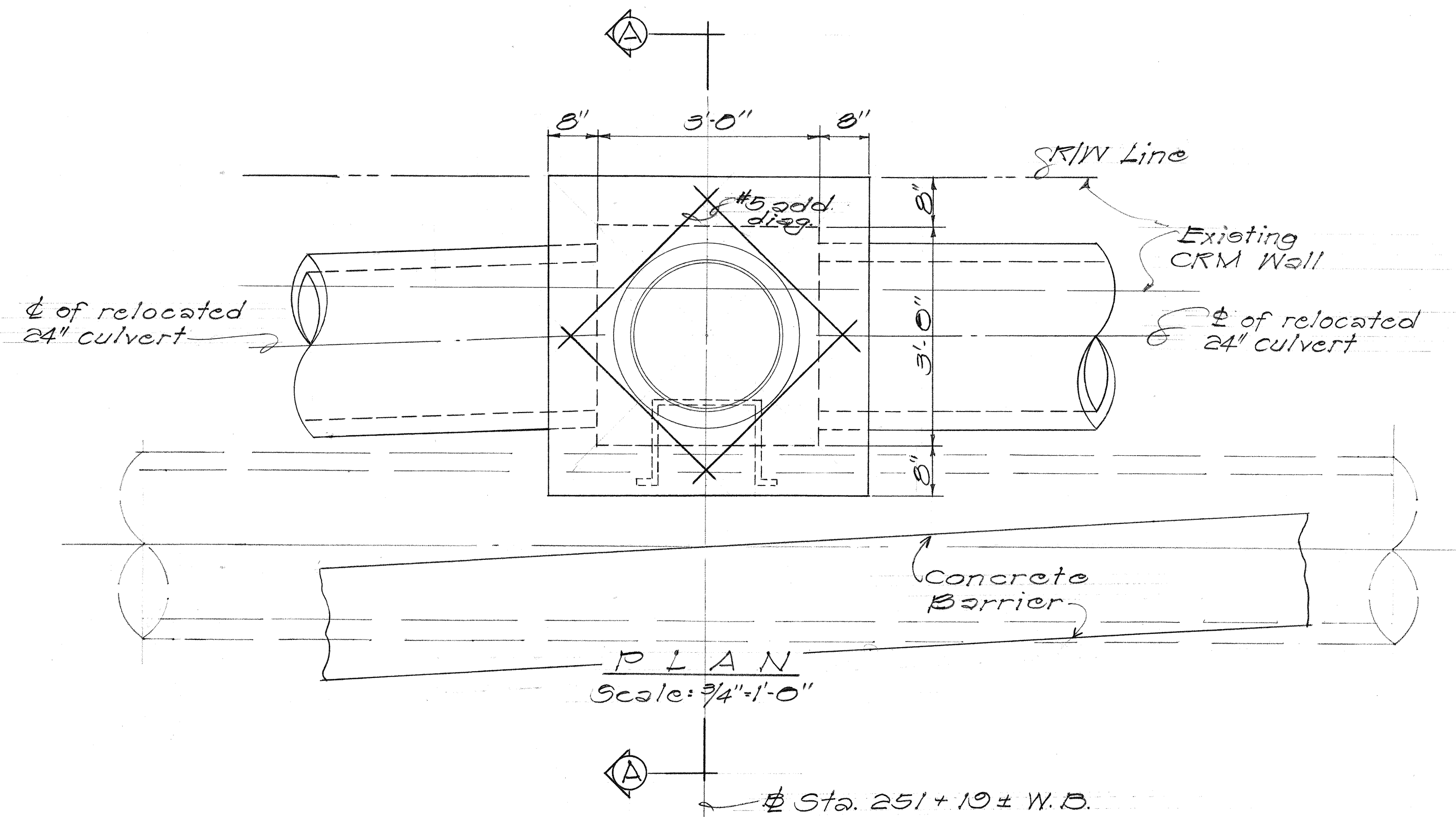
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	73	181



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



C.B. @ STA. 262+75 W.B.



NEW SDMH AT STA. 251+19± W.B.

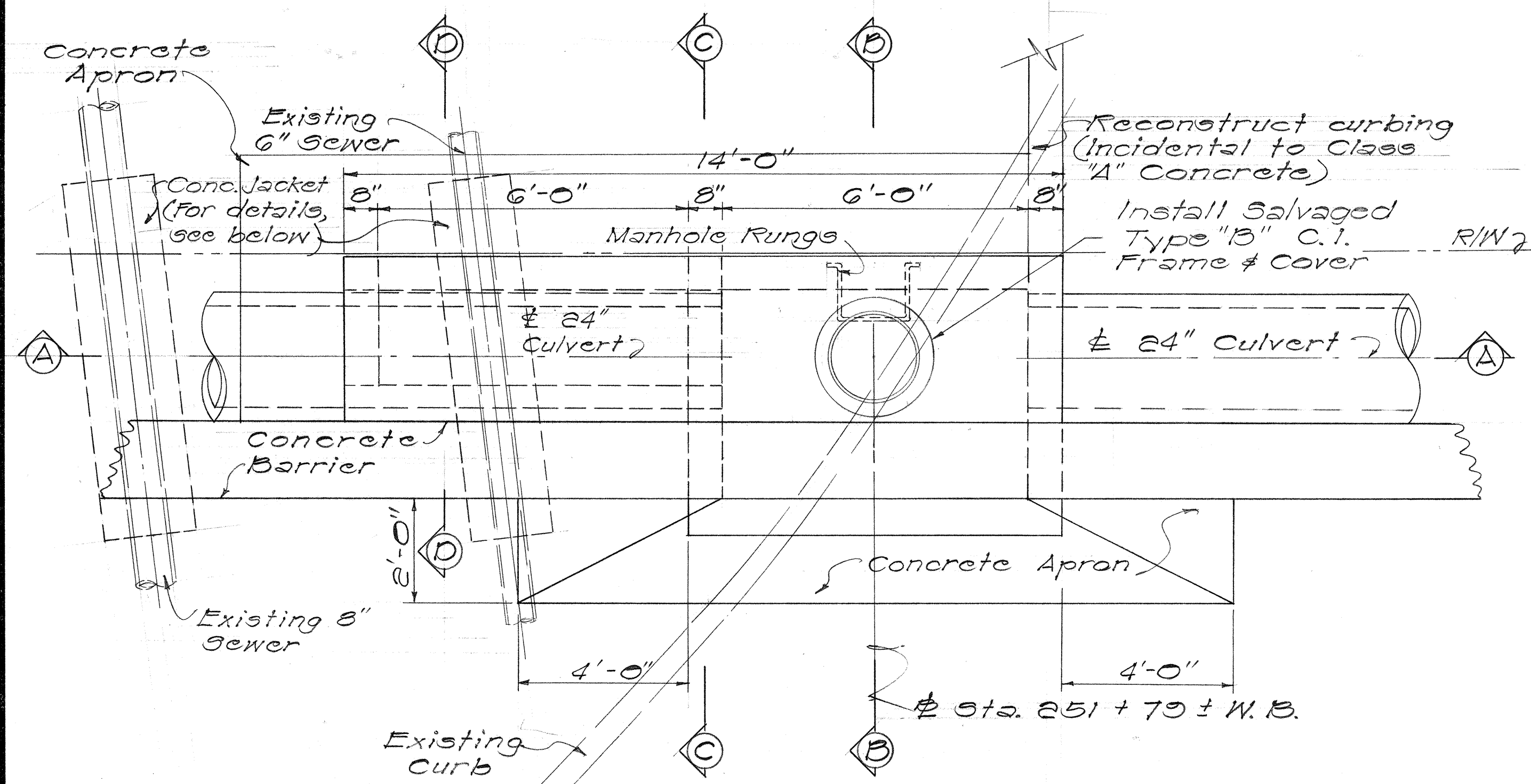
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60):23

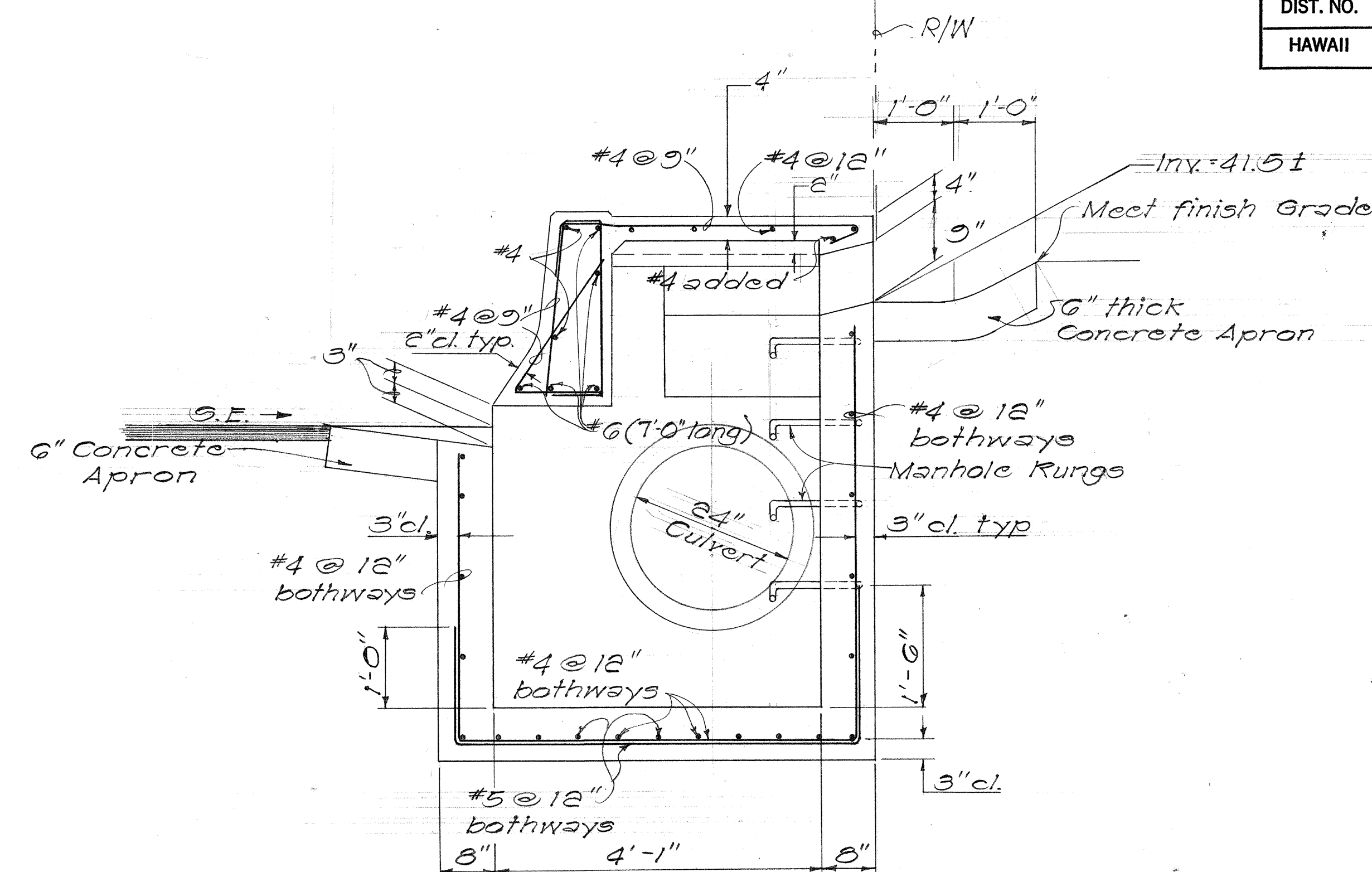
Scale: As Shown Date: Aug., 1976

SHEET NO. 11 H OF 41 H SHEETS

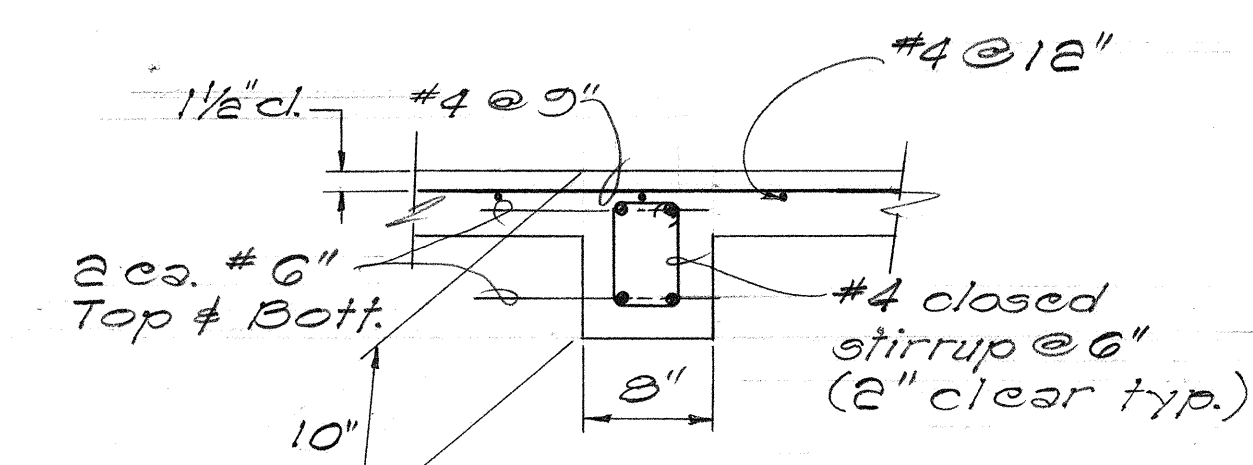
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (60):23	1976	74	181



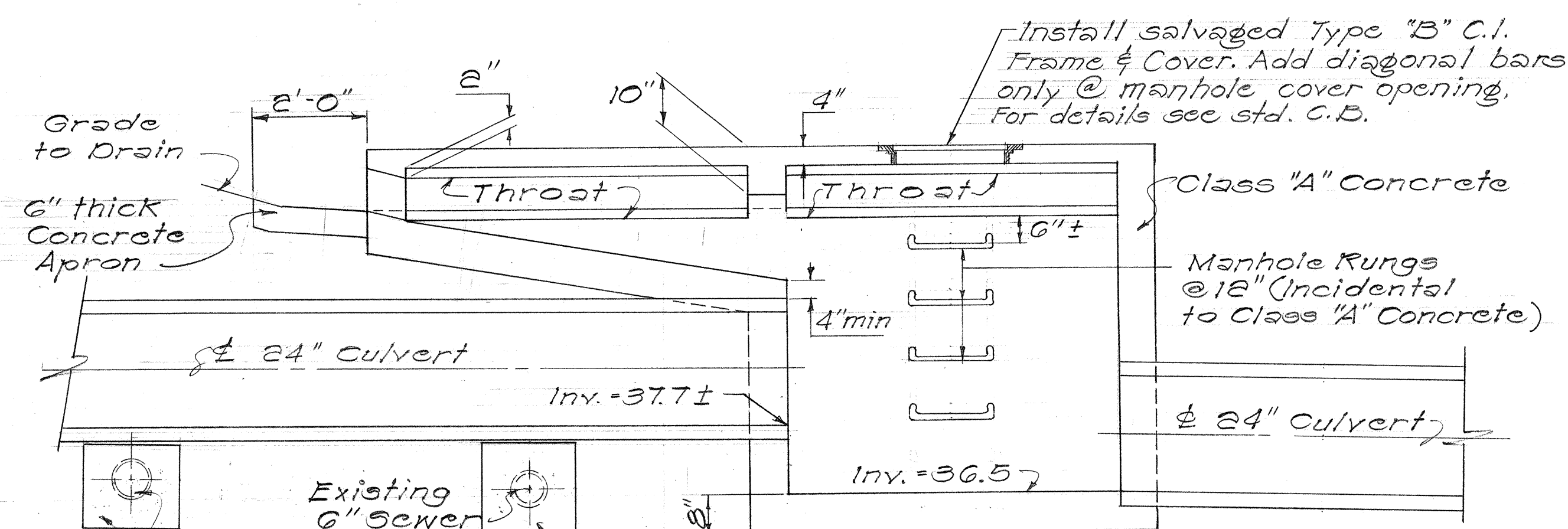
PLAN
Scale: $1/2" = 1'-0"$



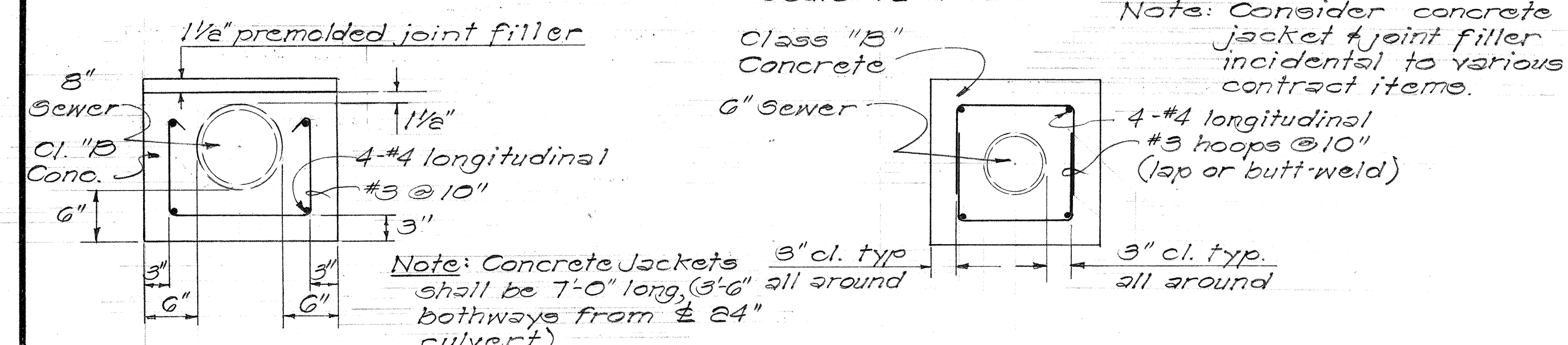
SECTION "B-B"
Scale: $\frac{3}{4} = 1'-0"$



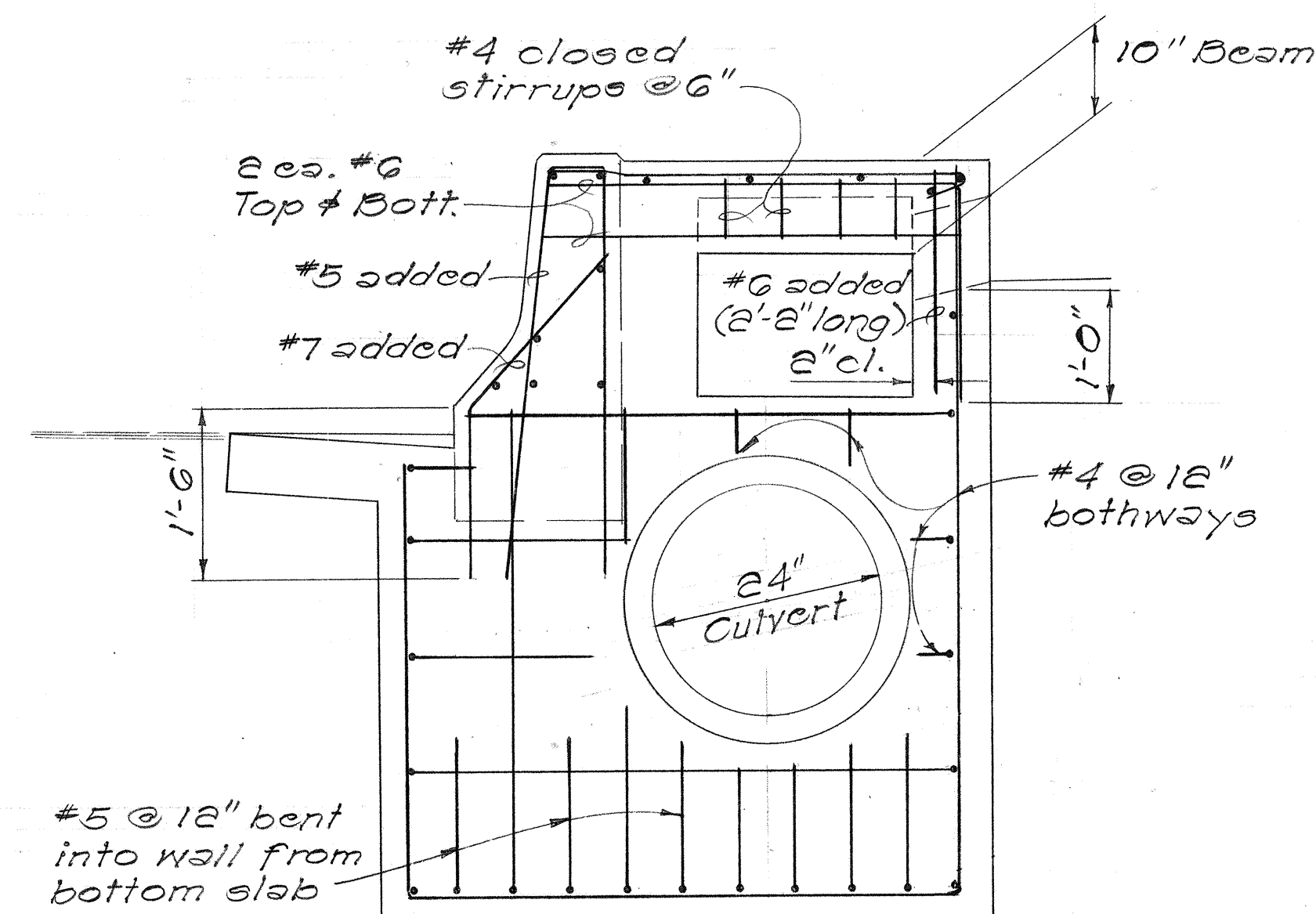
BEAM REINFORCING
Scale: $\frac{3}{4}'' = 1'-0''$



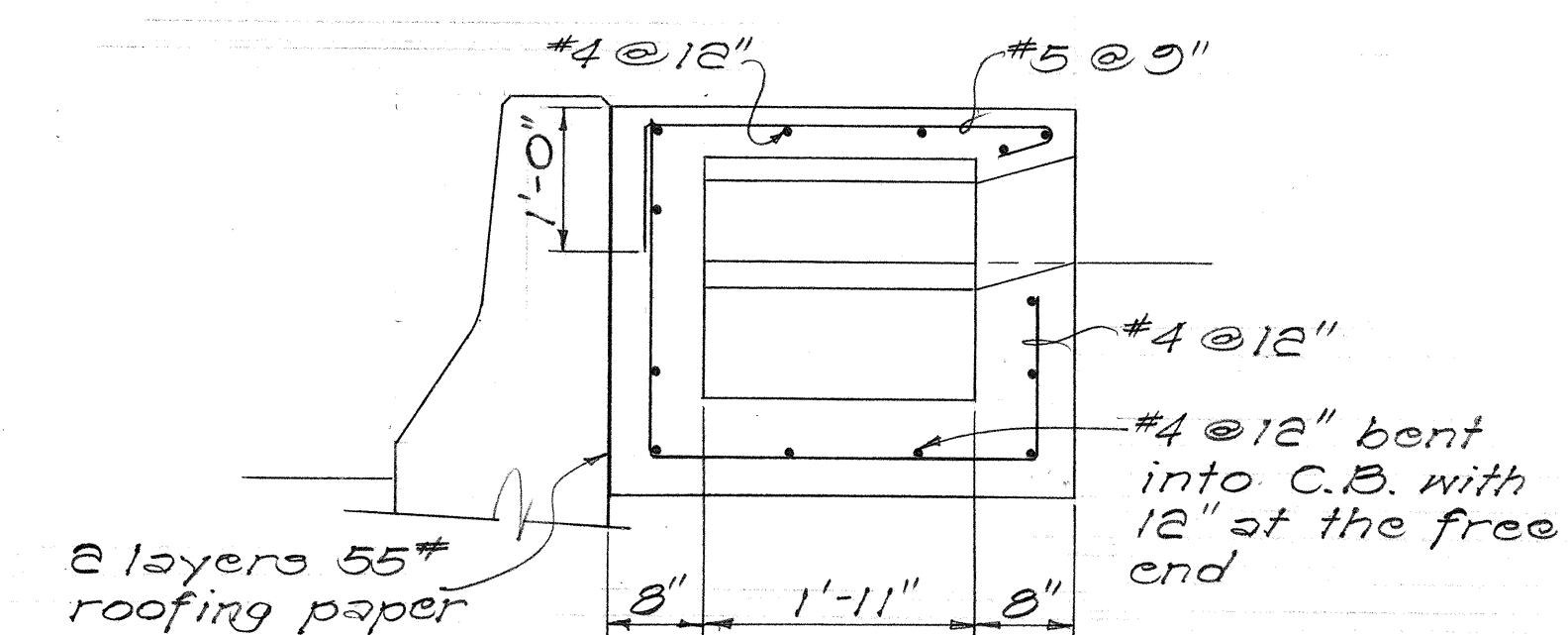
SECTION "A-A"
Scale: $\frac{1}{8}" = 1' - 0"$



CONCRETE JACKET DETAIL
Scale: 1" = 1'-0"



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



SECTION "D-D"
Scale: $\frac{3}{4}" = 1'-0"$

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-H1-1(60):23

Scale: As Shown Date: Aug., 1976

SHEET No. 124 OF 414 SHEETS

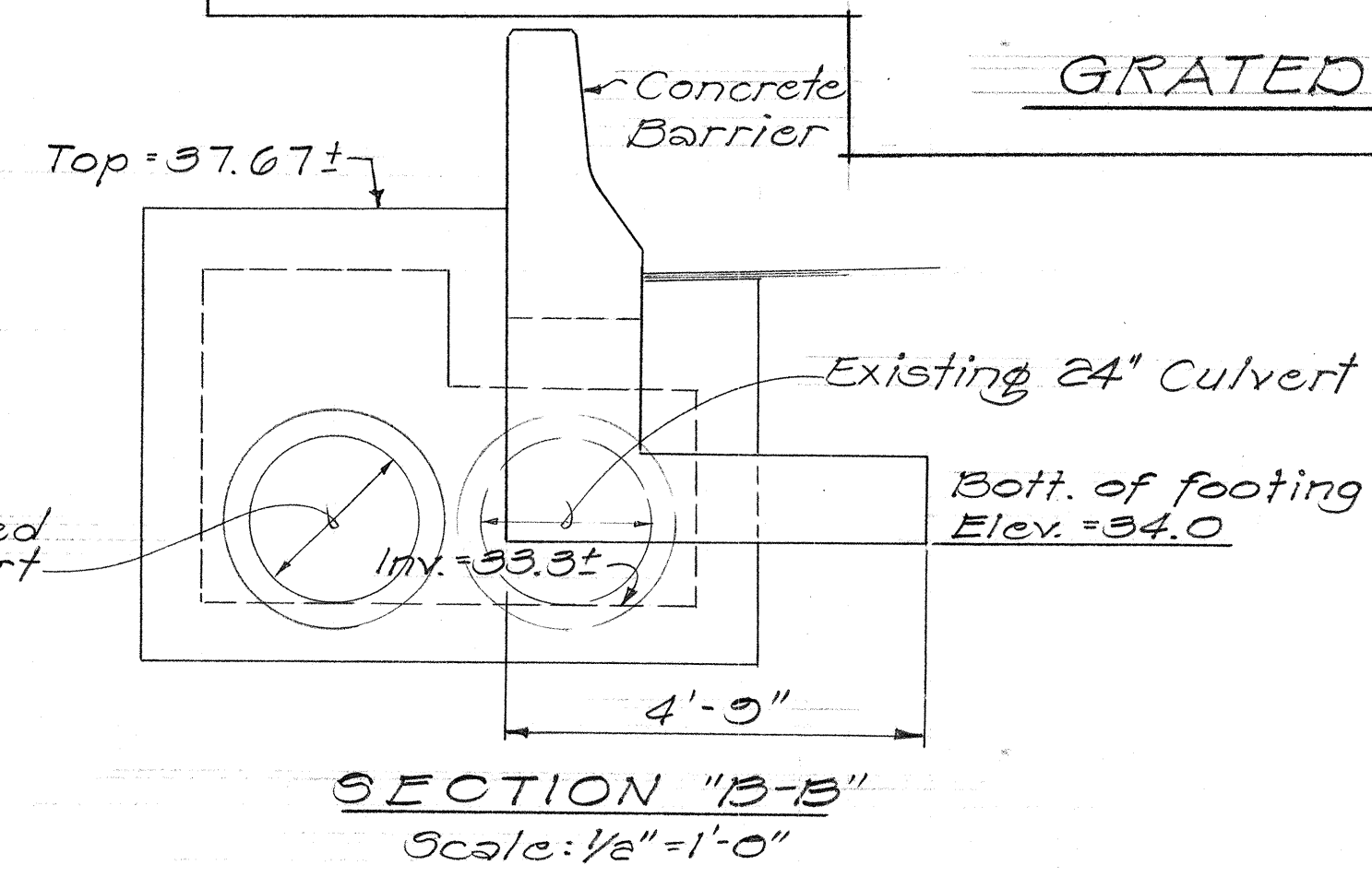
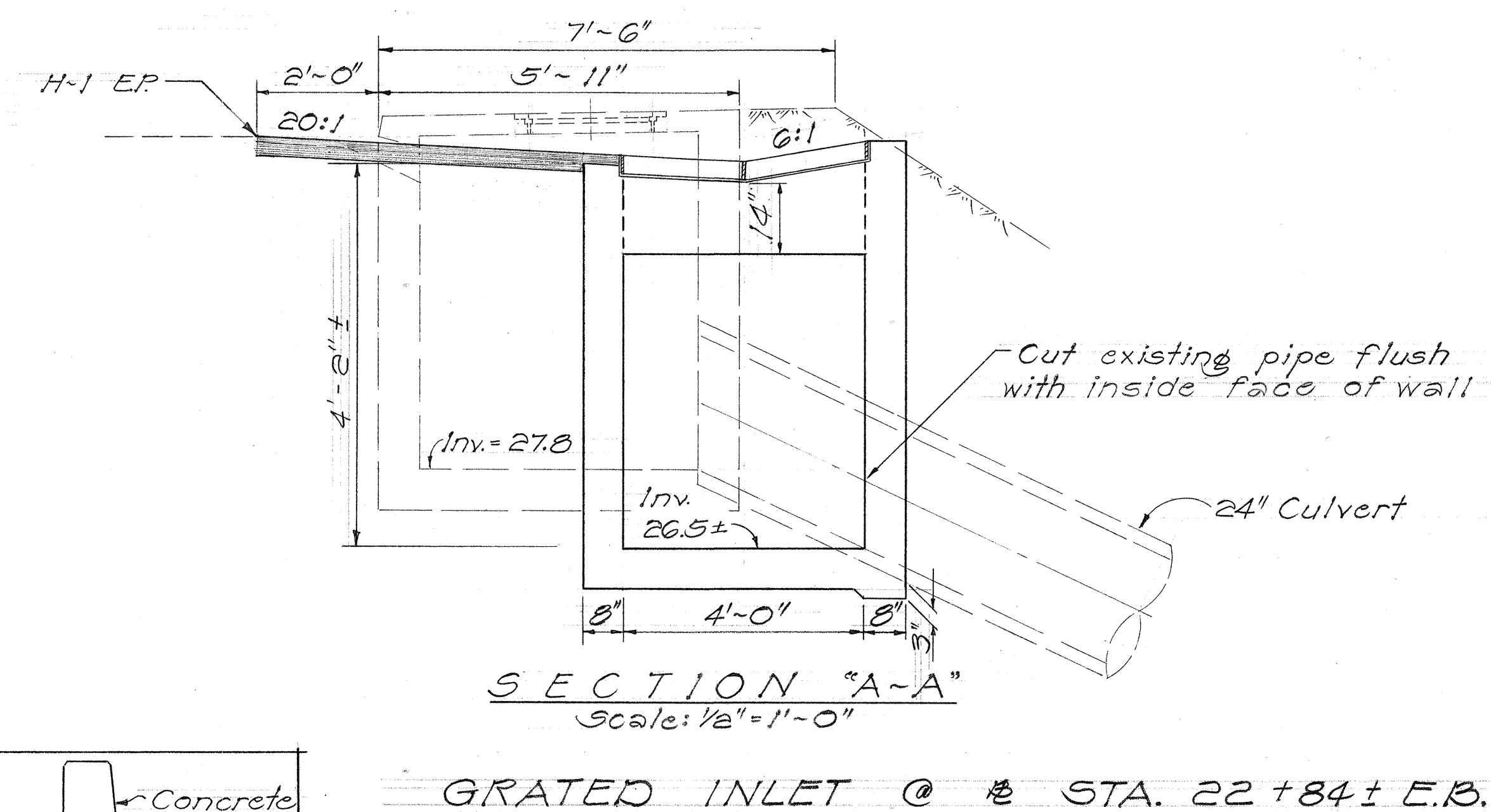
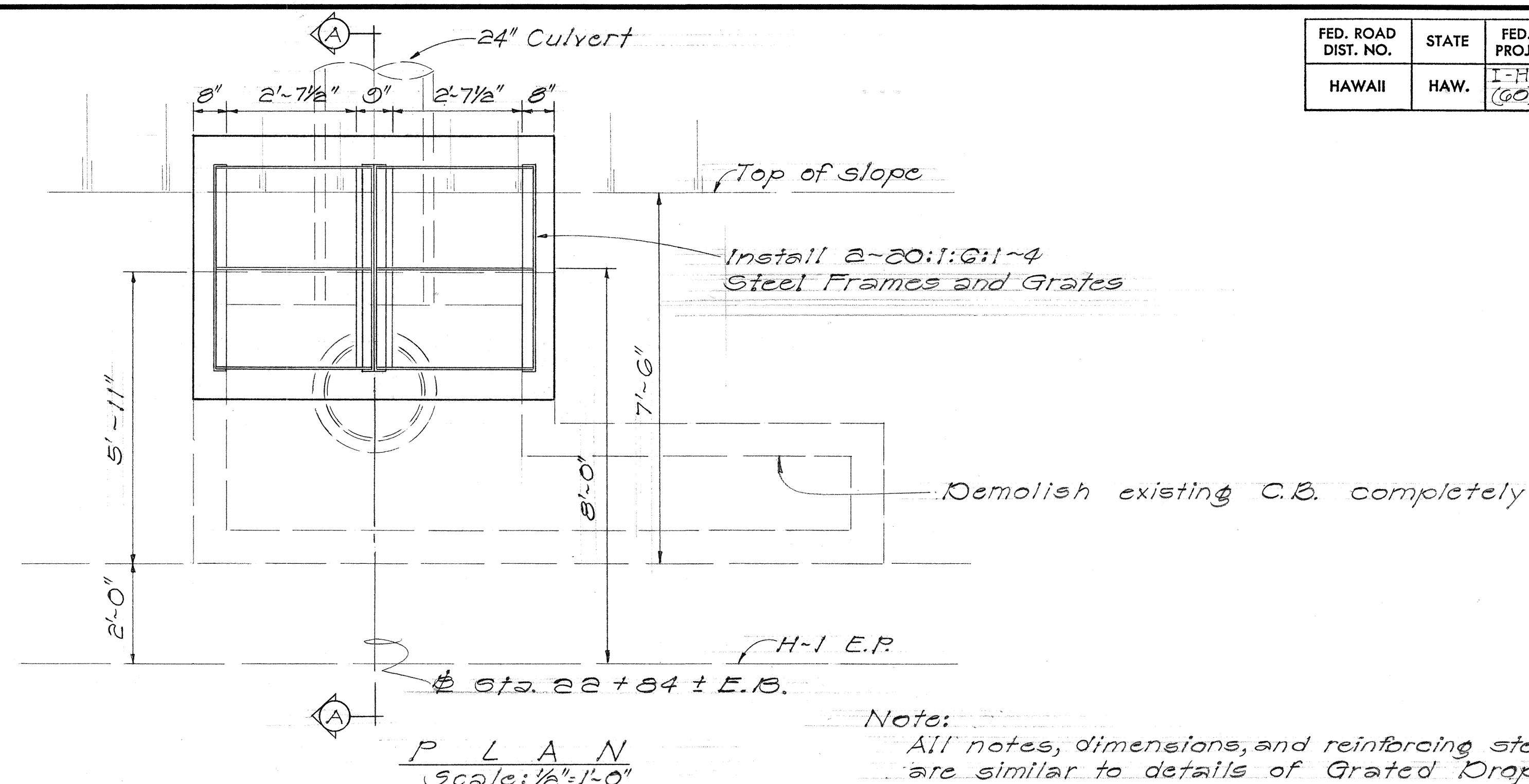
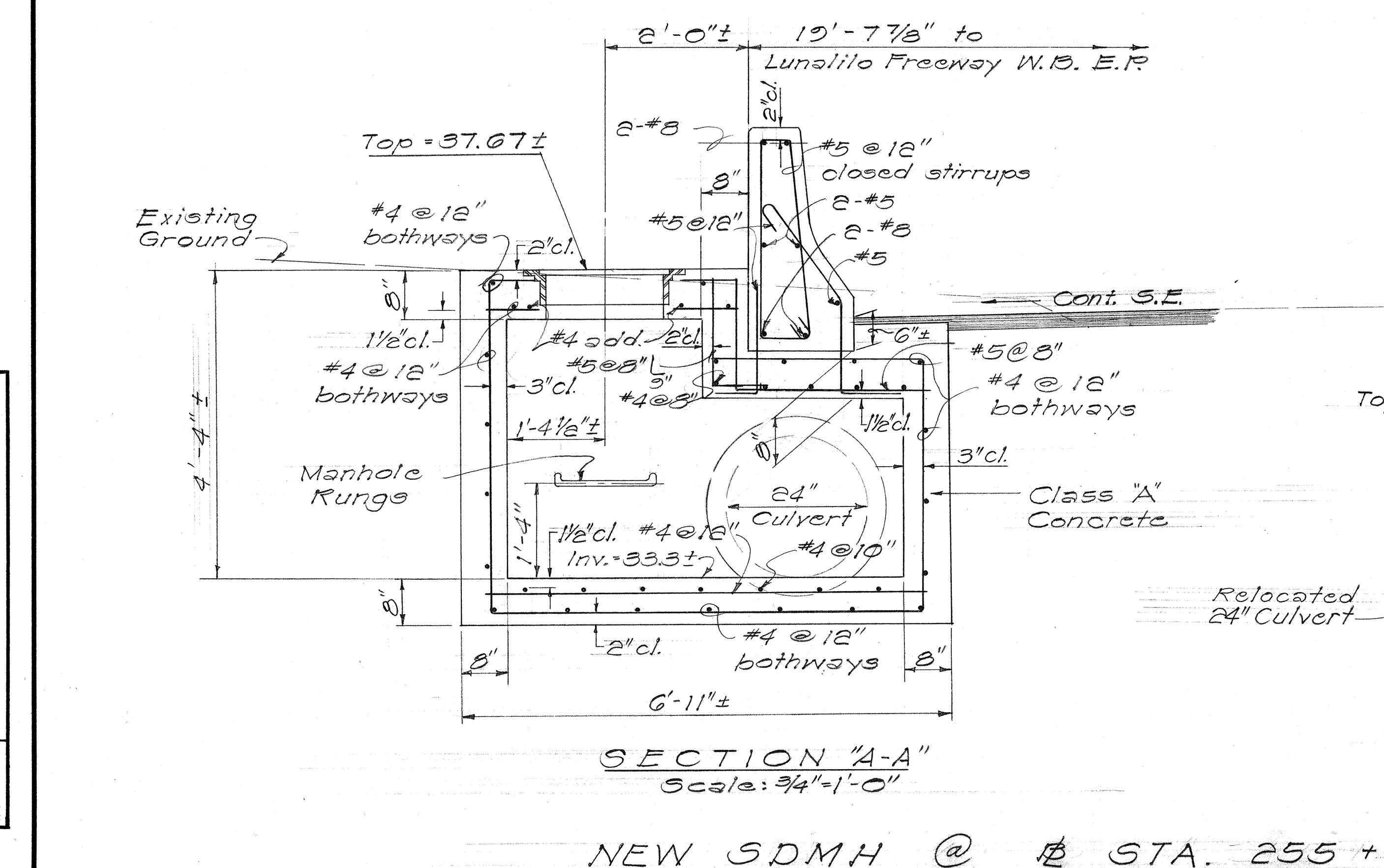
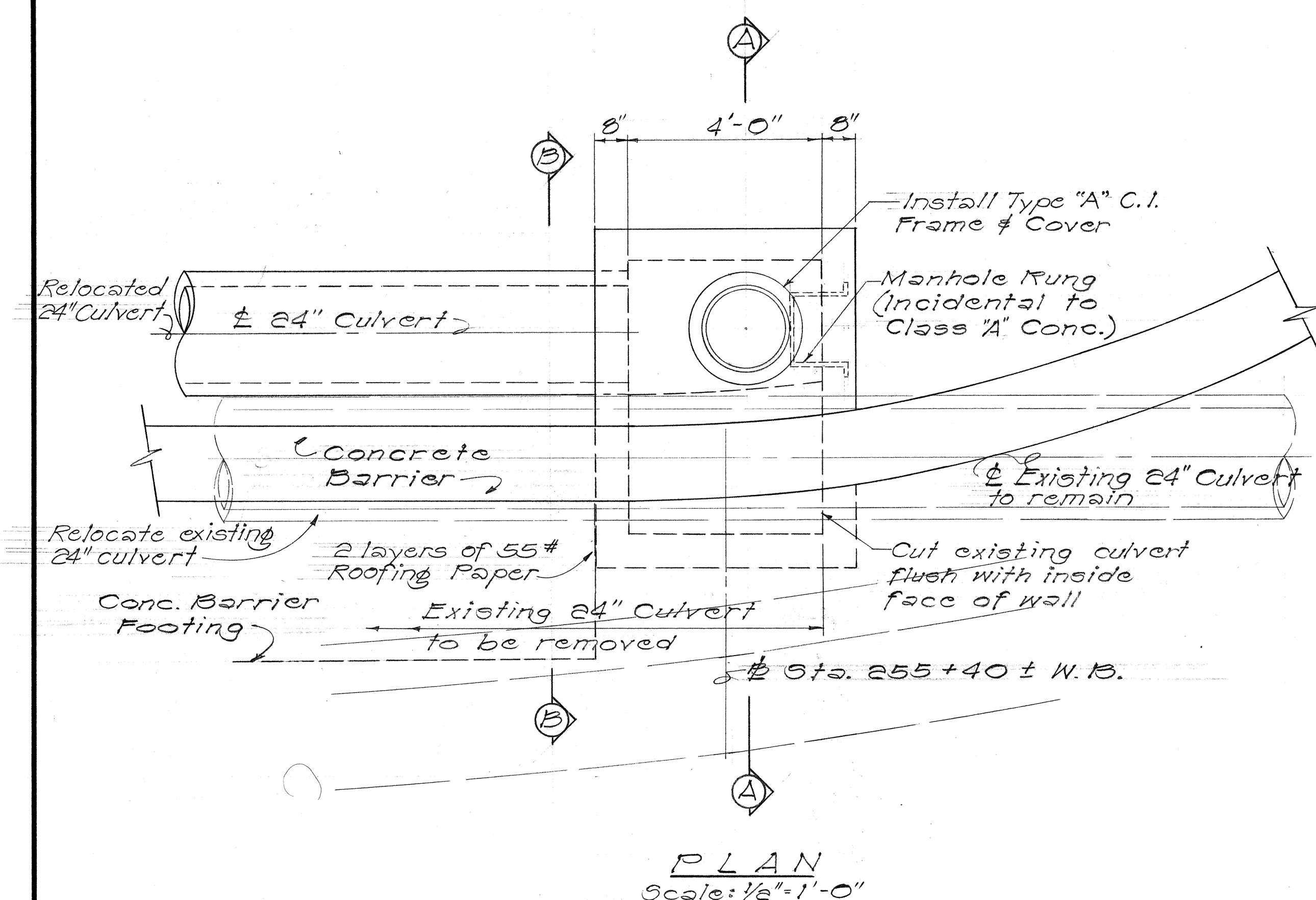
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

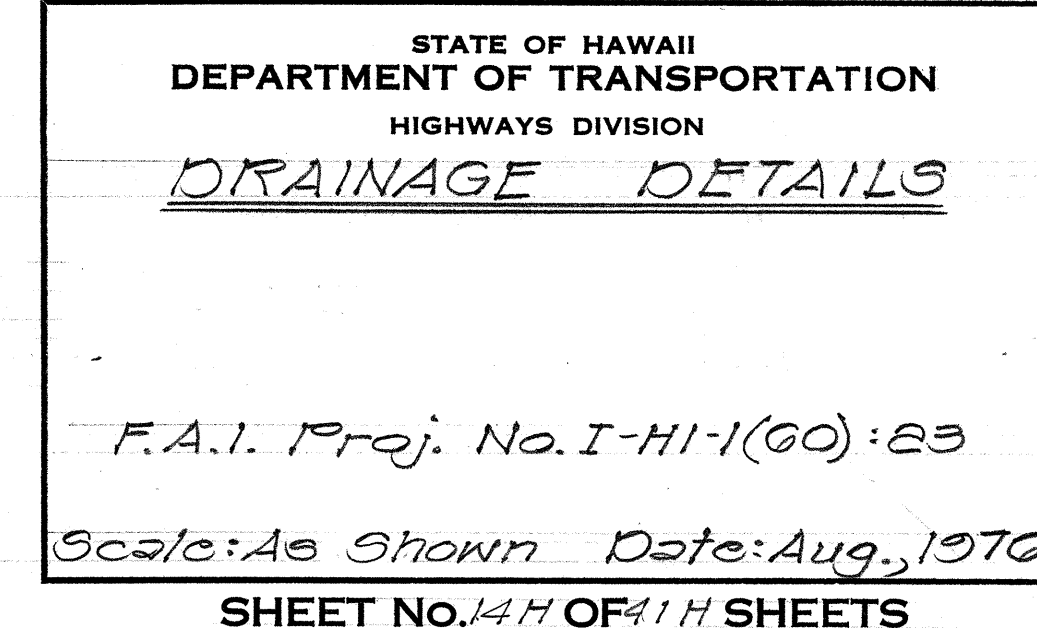
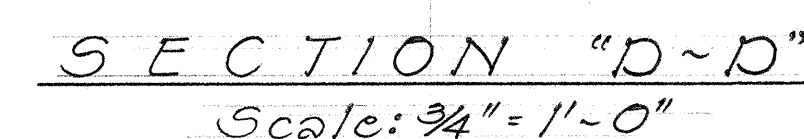
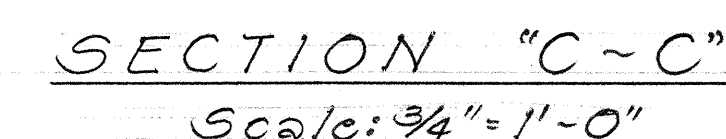
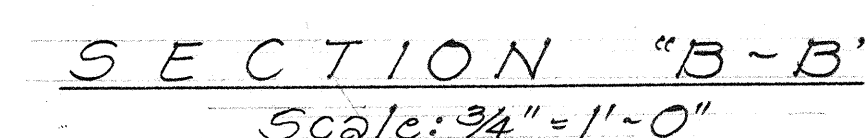
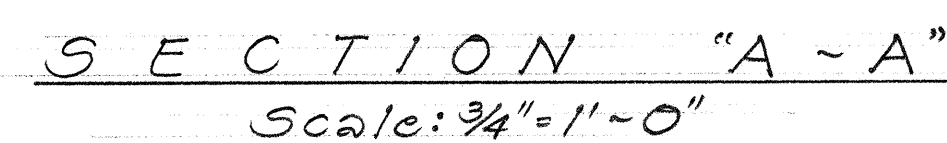
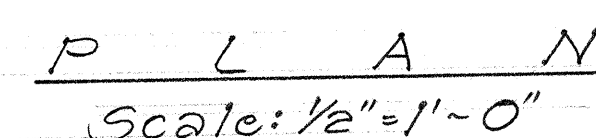
F.A.I. Proj. No. I-HI-1(60) : B3

Scale: As Shown Date: Aug., 1970

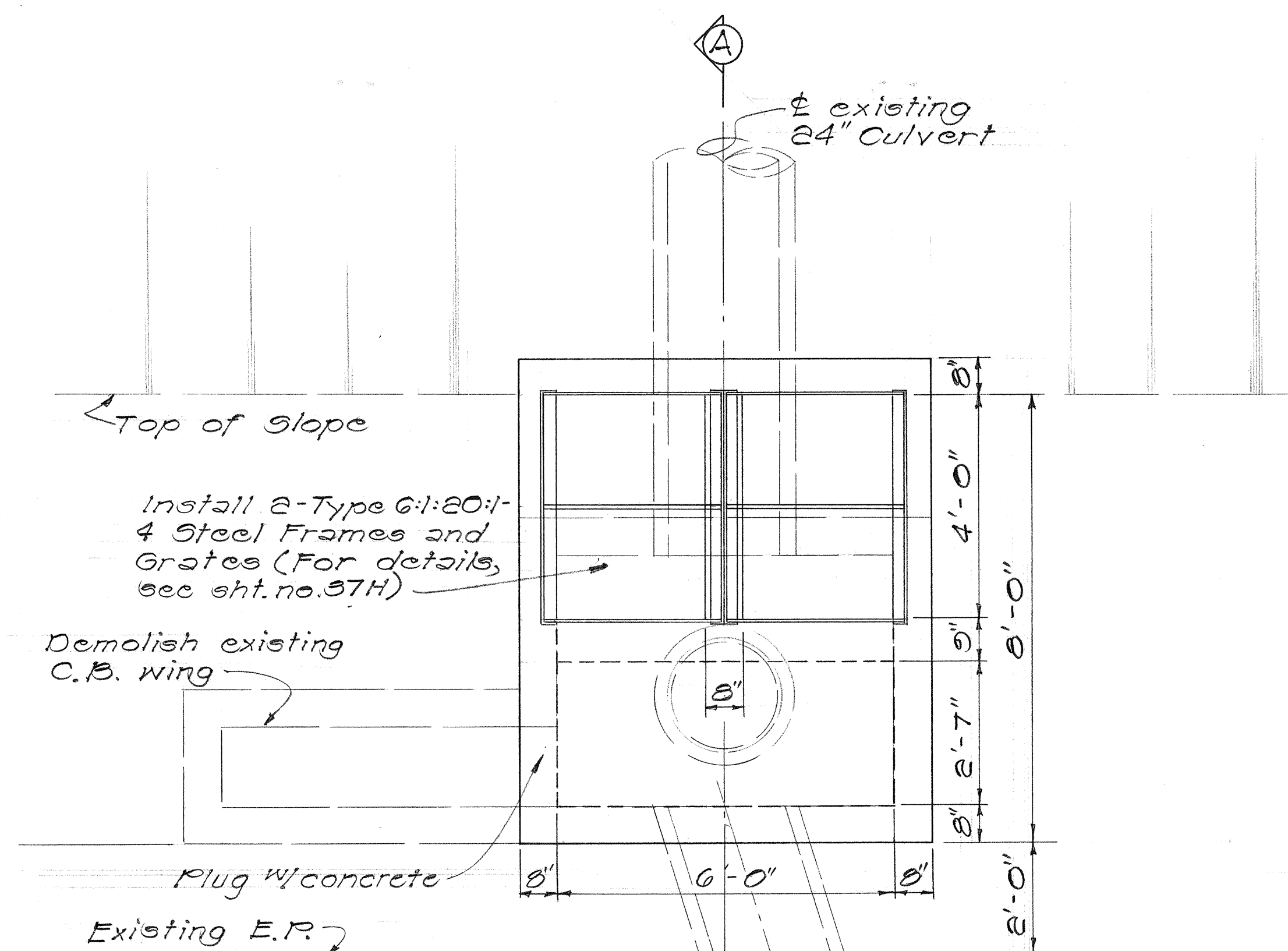
SHEET No. 134 OF 414 SHEETS



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

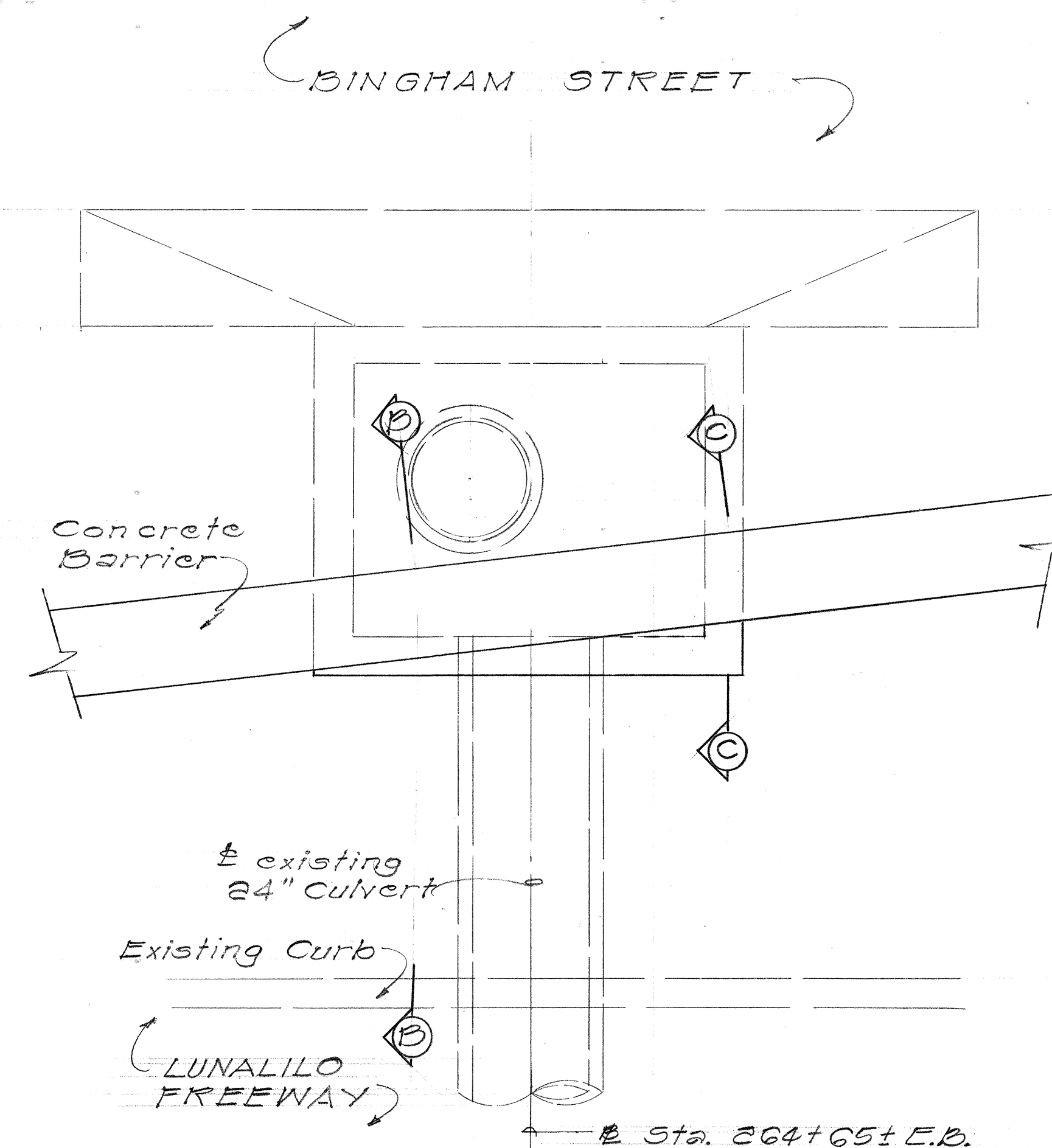


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	77	181

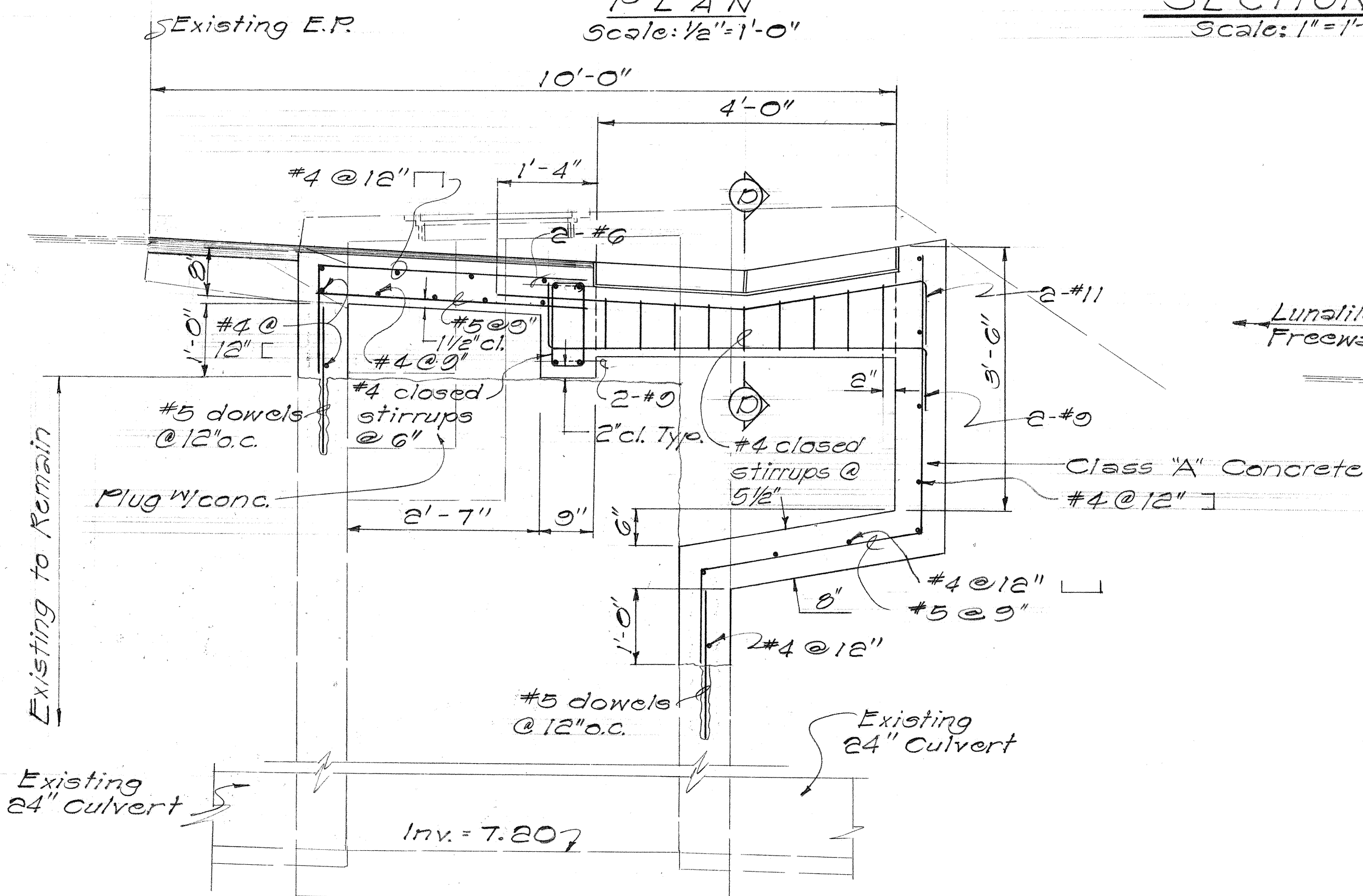


PLAN
Scale: 1/2" = 1'-0"

SECTION D-D
Scale: 1" = 1'-0"

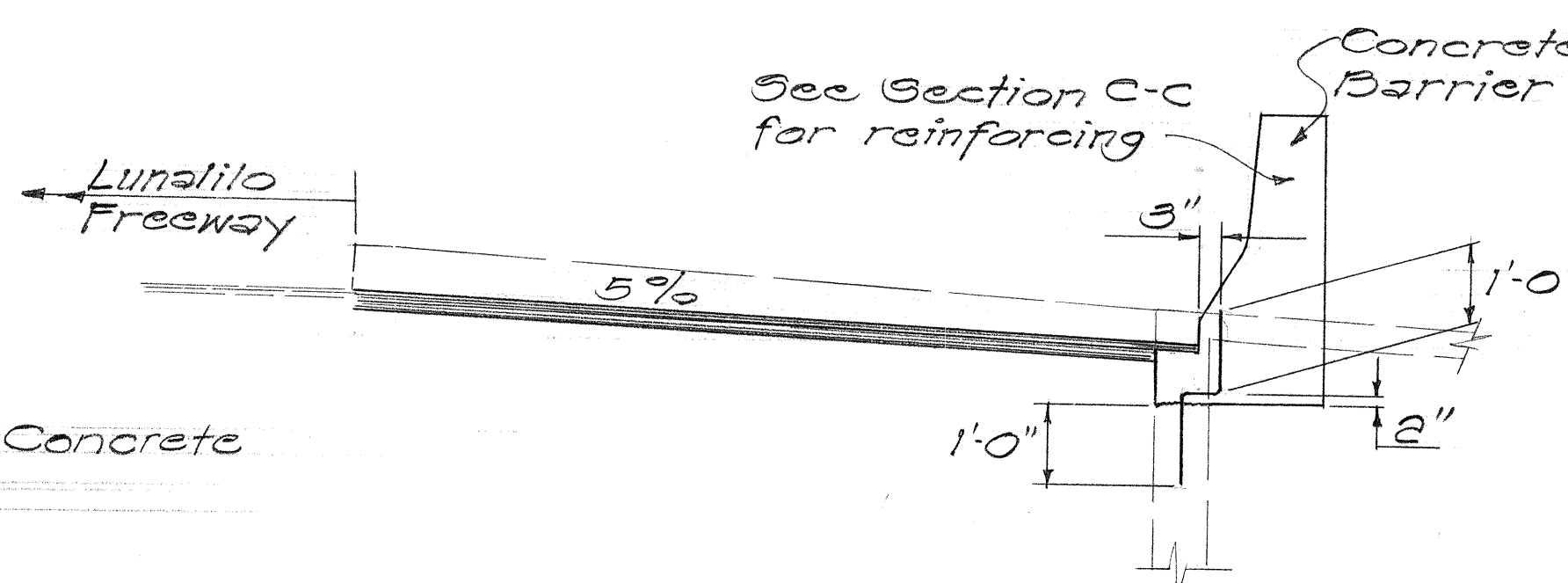


PLAN
Scale: 1/2" = 1'-0"



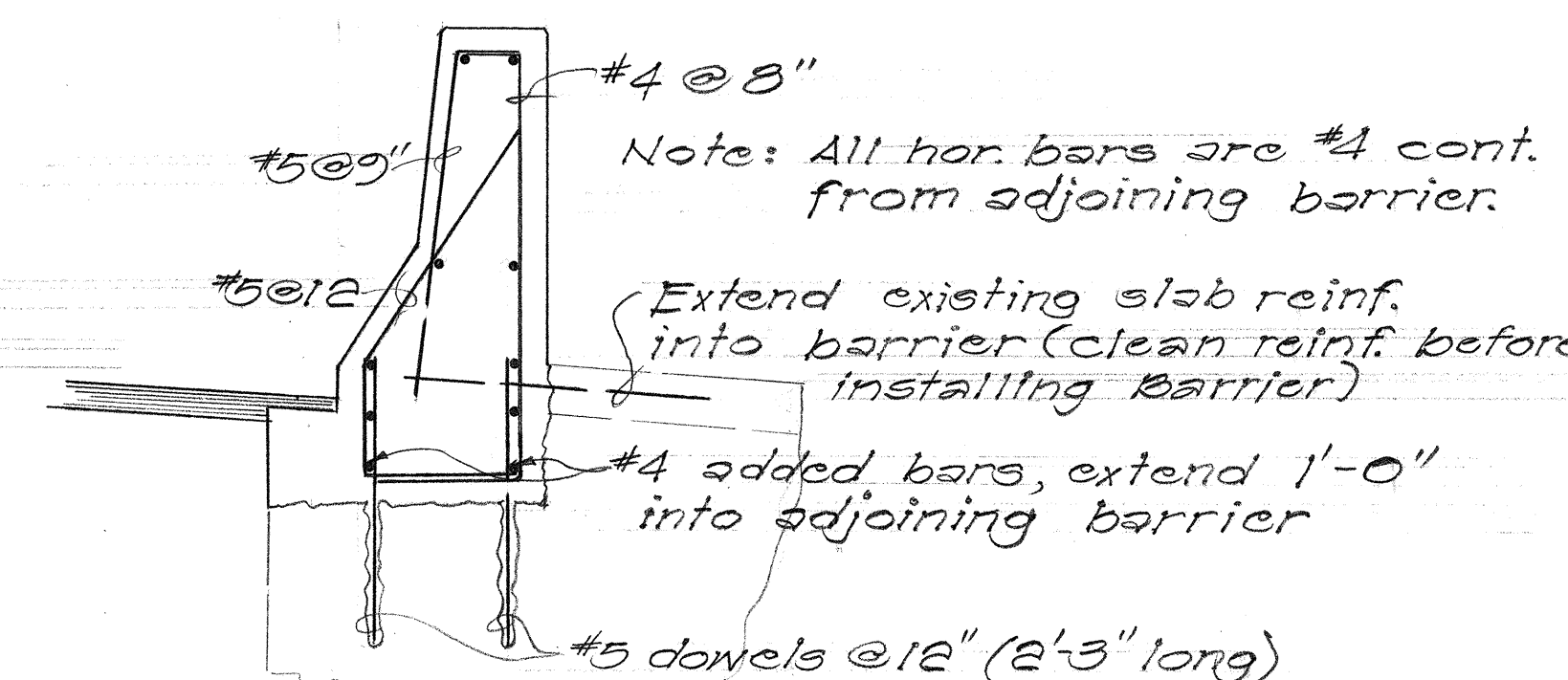
SECTION "A-A"
Scale: 3/4" = 1'-0"

GRADED INLET @ STA. G+45± E.B.



SECTION "B-B"
Scale: 1/8" = 1'-0"

C.B. @ STA. 264+65± E.B.



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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

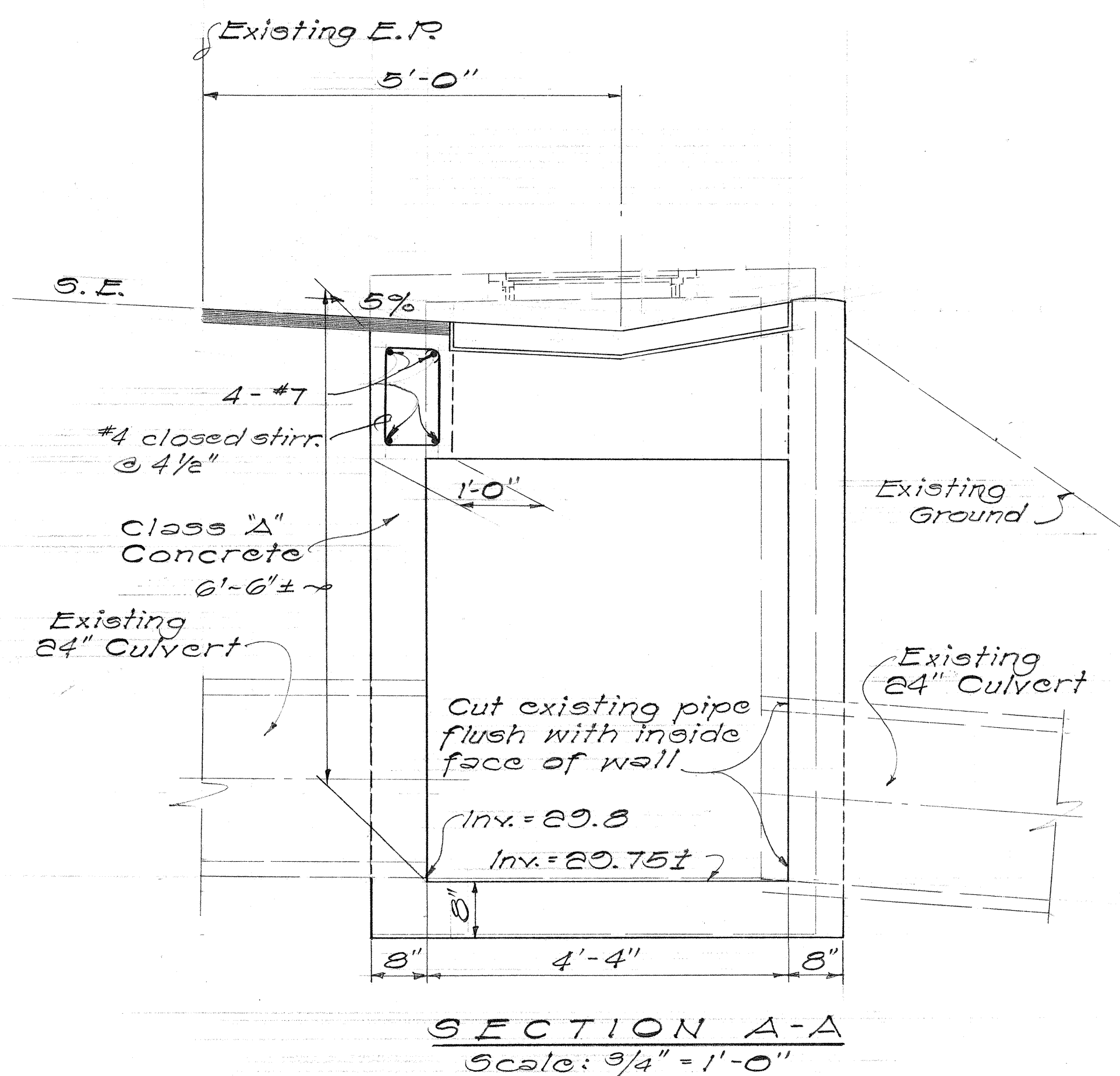
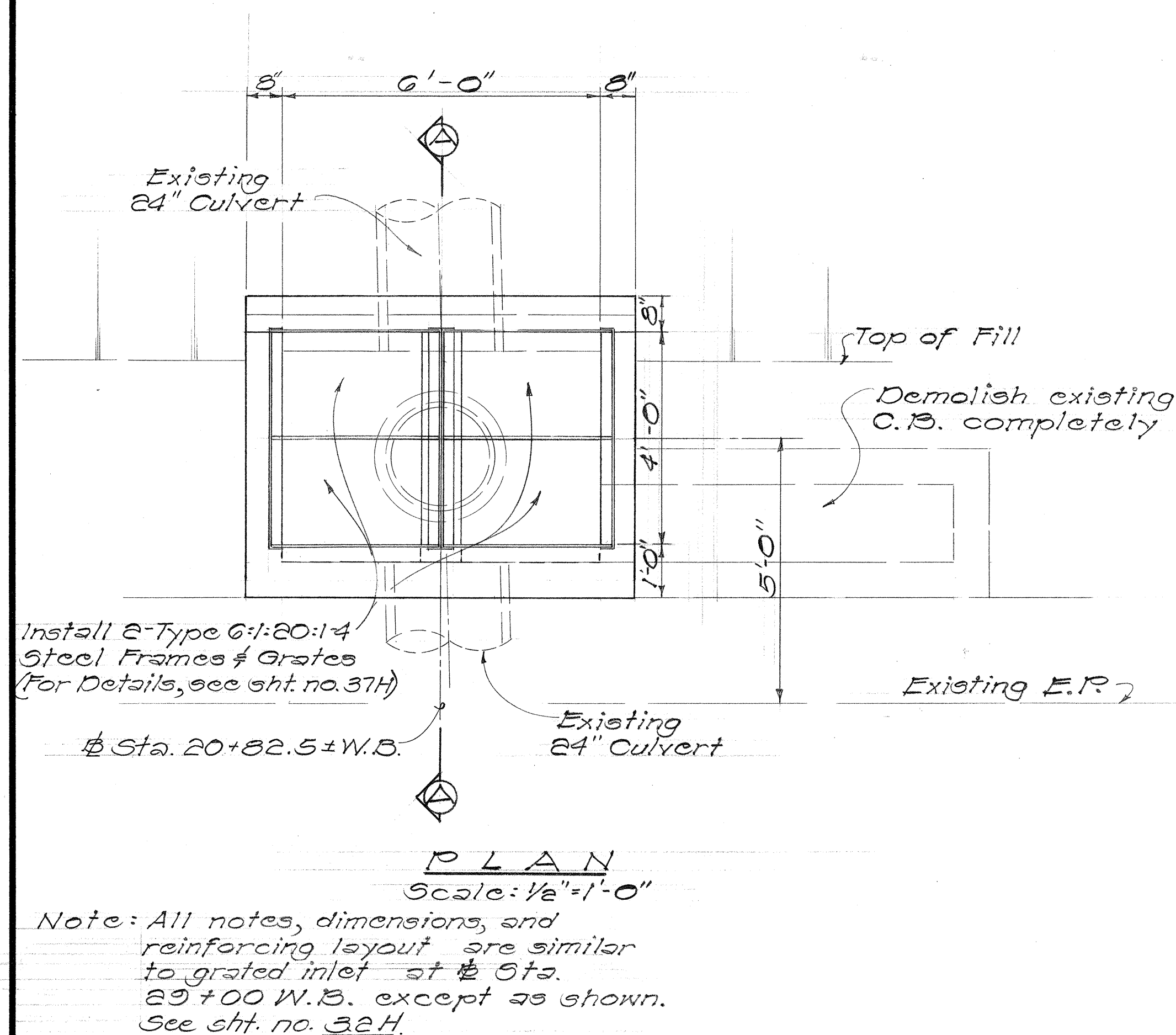
F.A.I. Proj. No. I-HI-1(60):23

Scale: As Shown Date: Aug., 1976

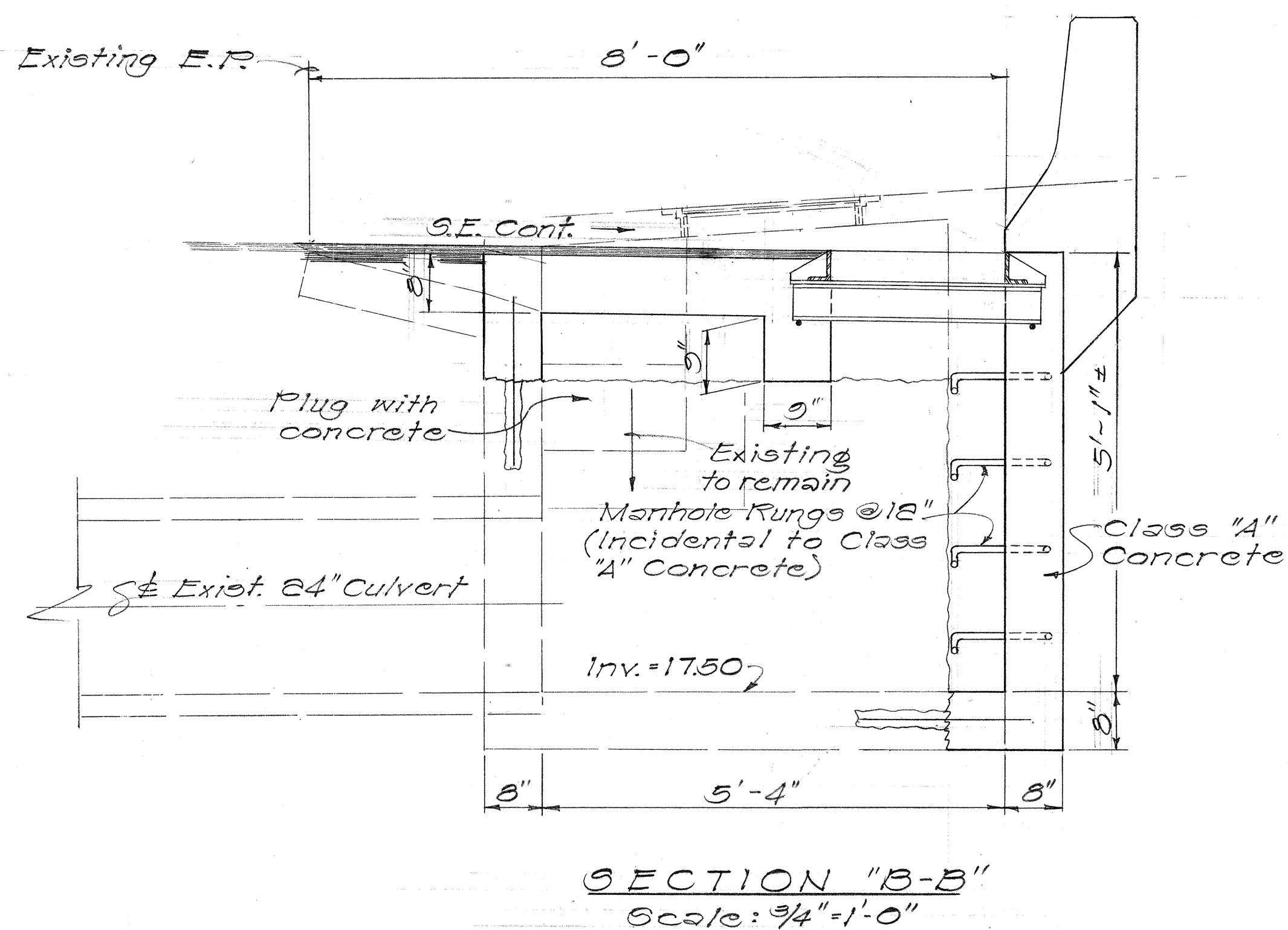
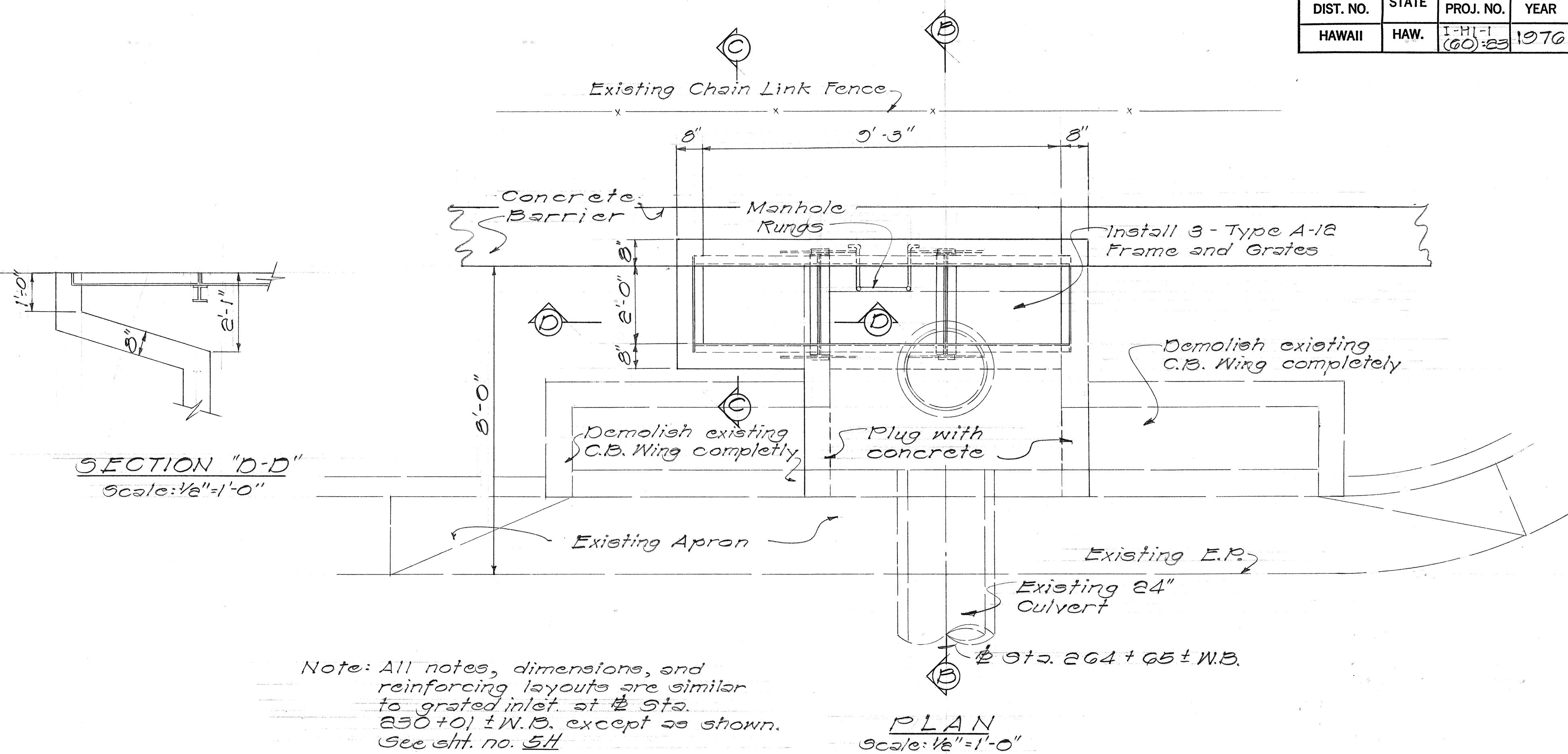
SHEET No. 15H OF 41H SHEETS

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60)-23	1976	78	181



GRATED INLET @ STA. 20+82.5± W.B.



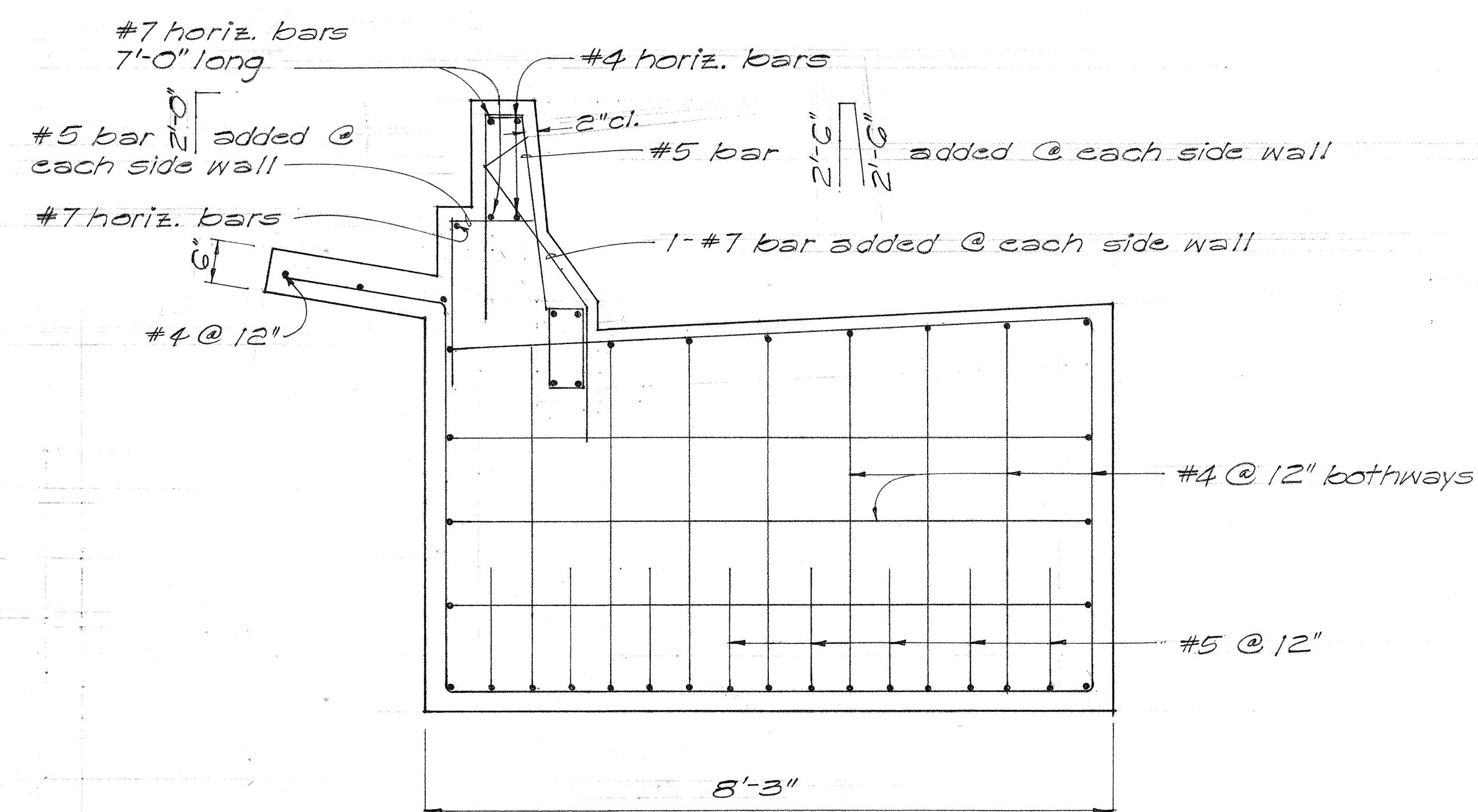
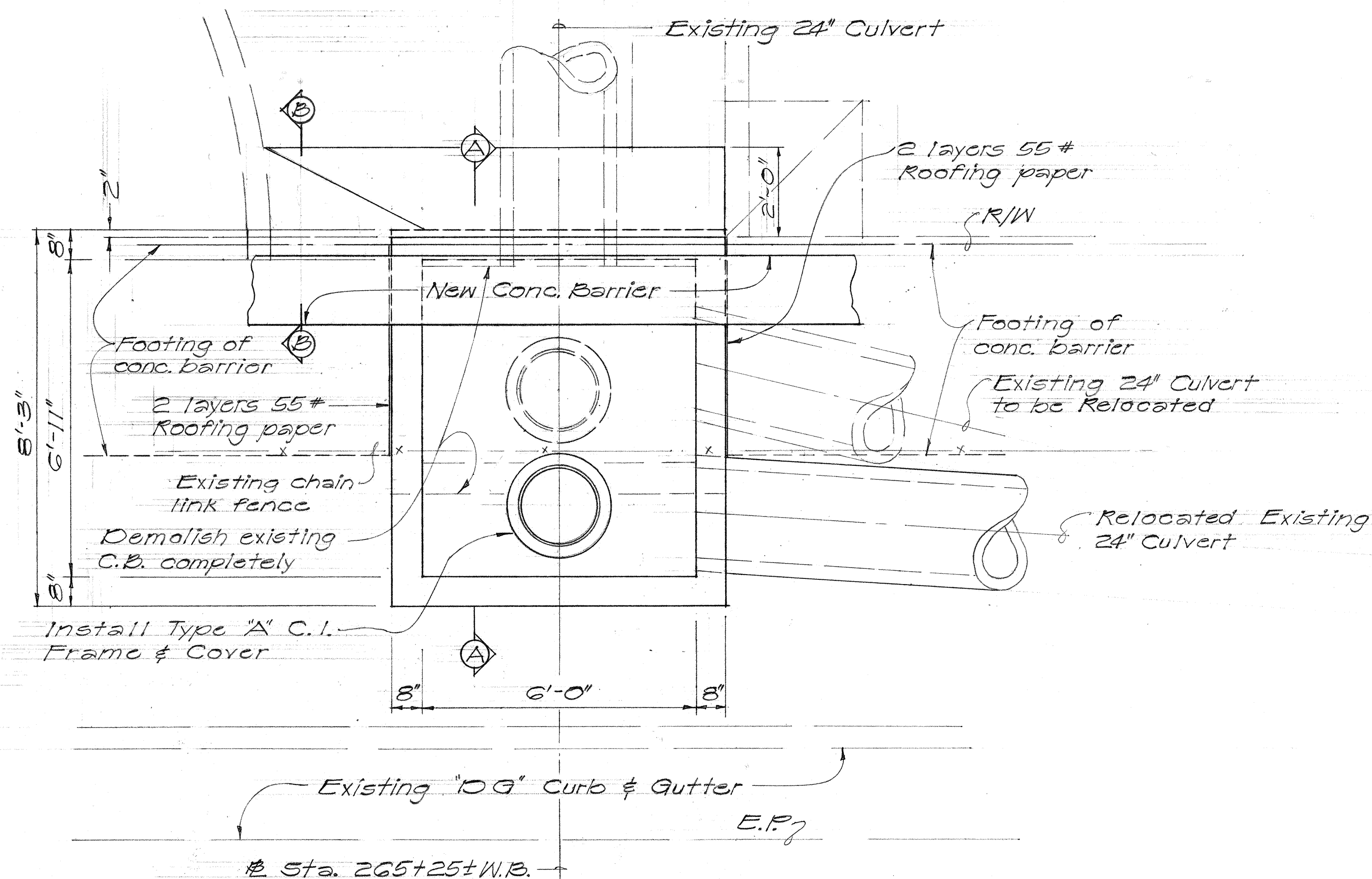
GRATED INLET @ STA. 264+65± W.B.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

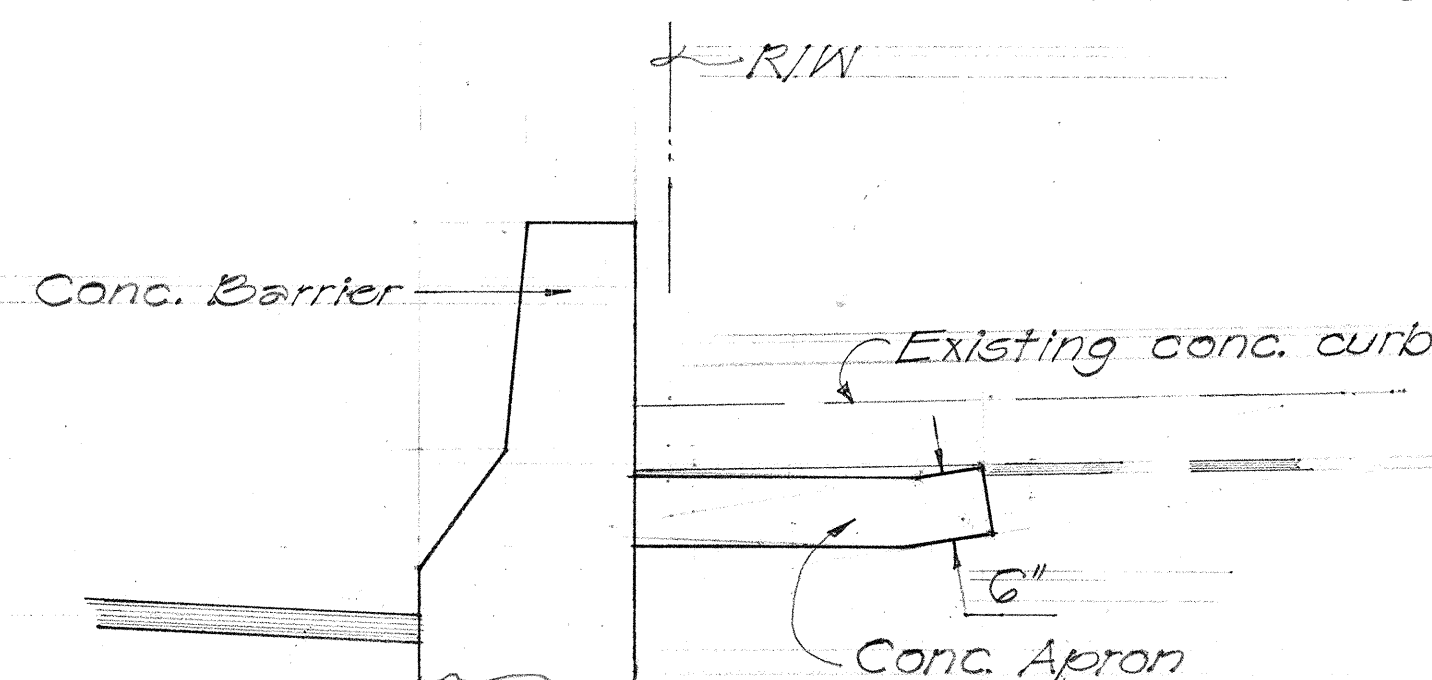
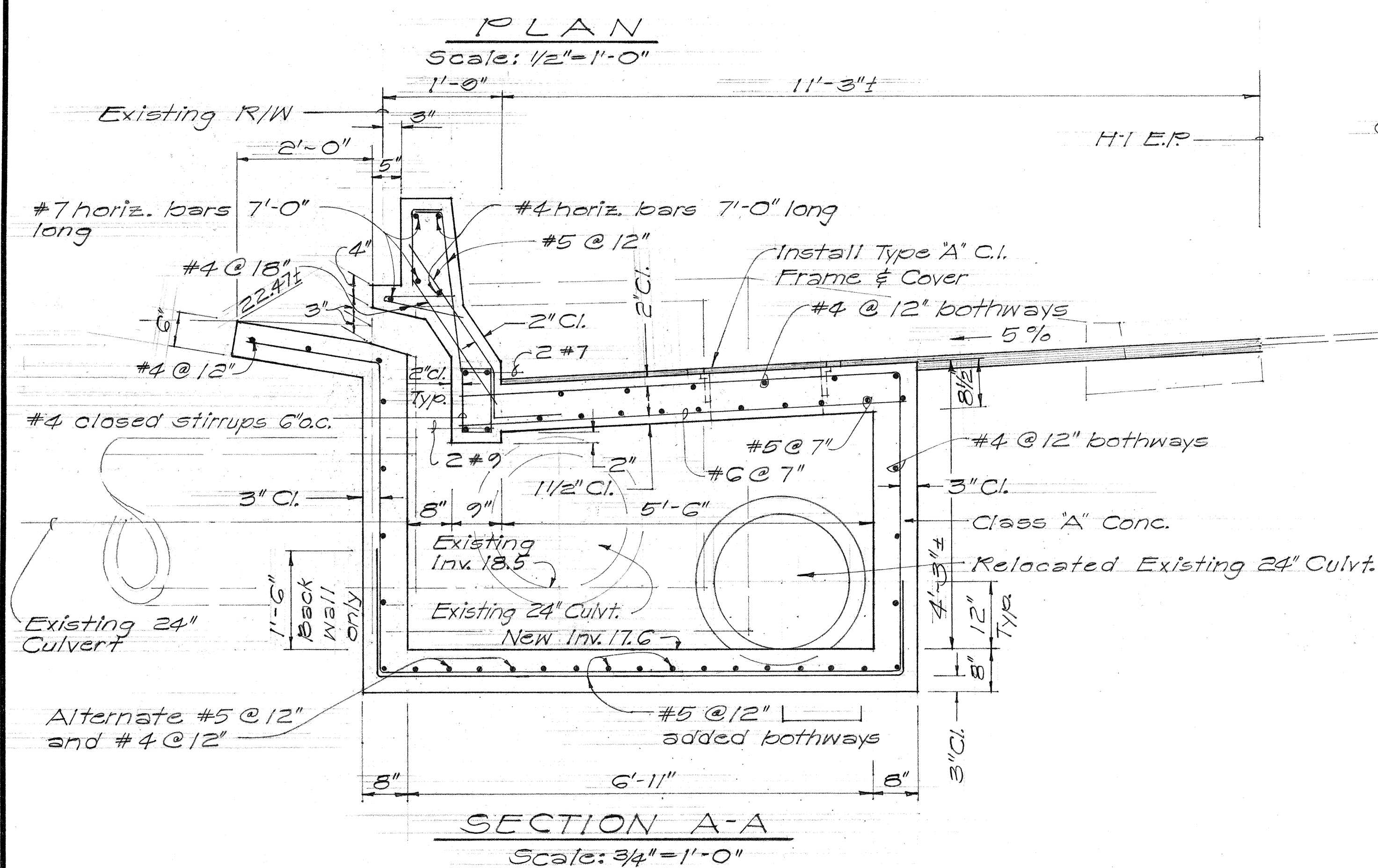
F.A.I. Proj. No. I-HI-1(60)-23
Scale: As Shown Date: Aug. 1976
SHEET No. 164 OF 417 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HA-1(60)-23	1976	79	181



SECTION AT END WALLS
Scale: $\frac{3}{4}" = 1'-0"$



SECTION B-B
Scale: $\frac{3}{4}'' = 1' - 0''$

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

C.B. @ \$ STA. 265+25 ± W.B.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60):23

Scale: As Shown Date: Aug. 1976

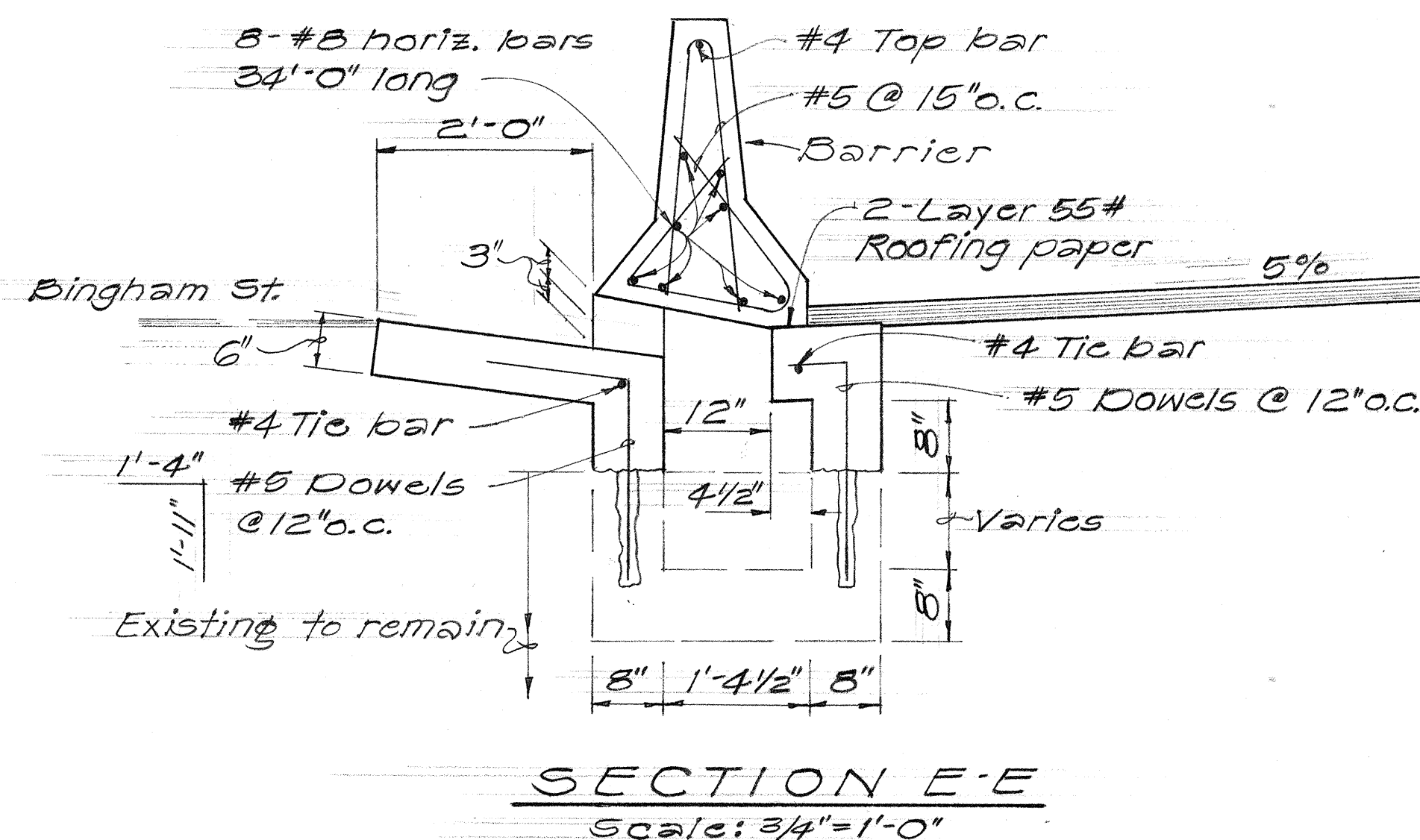
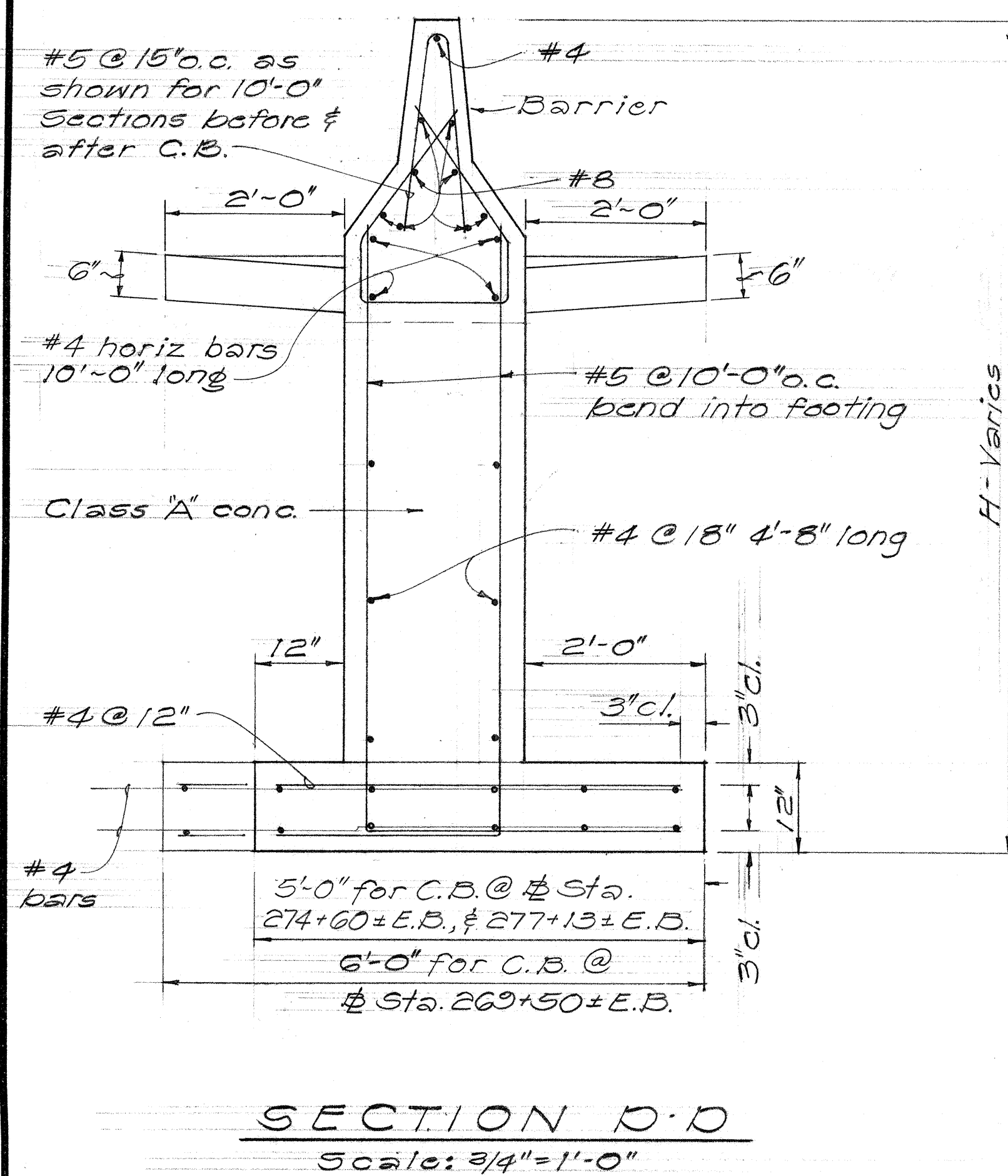
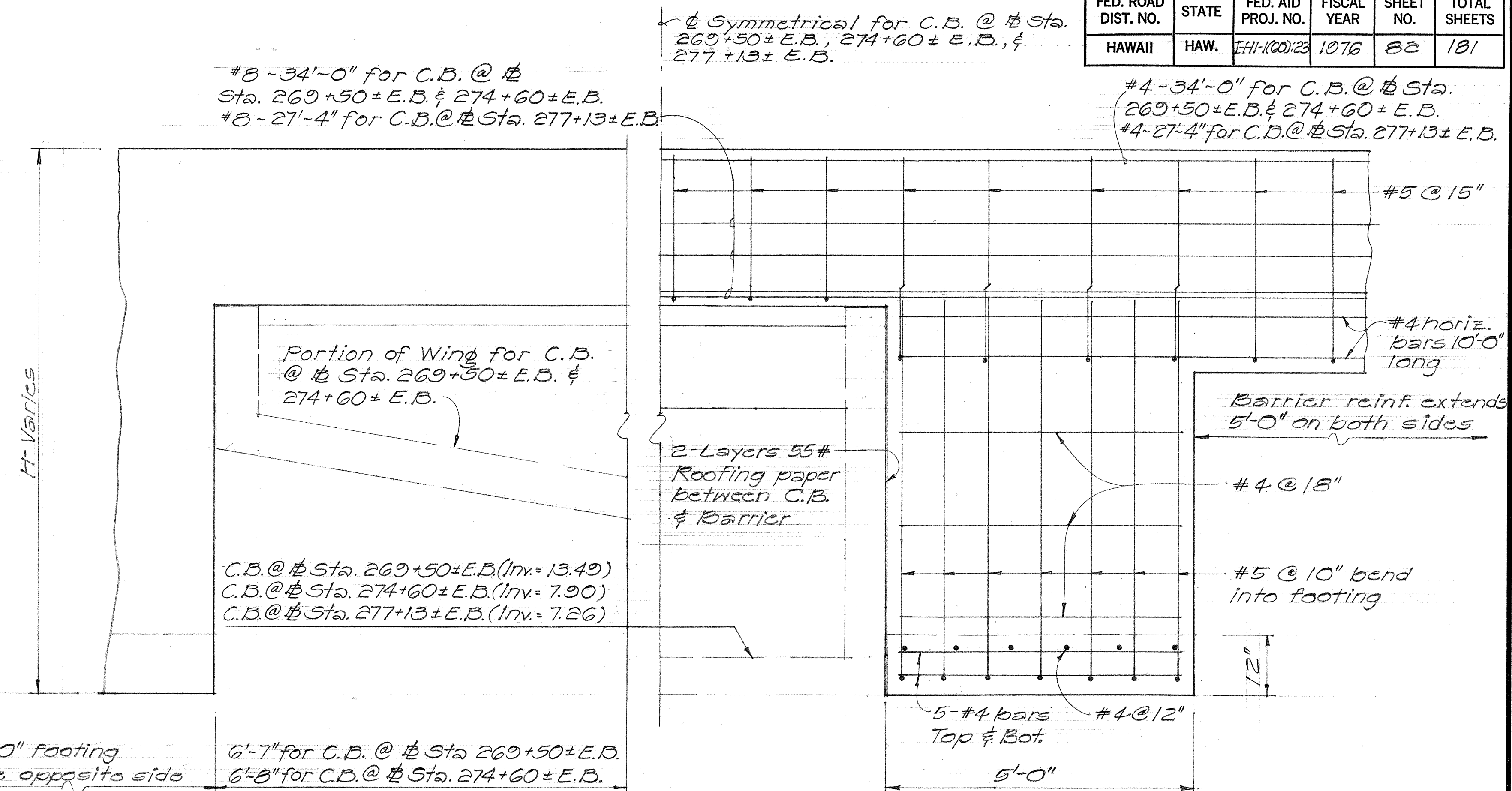
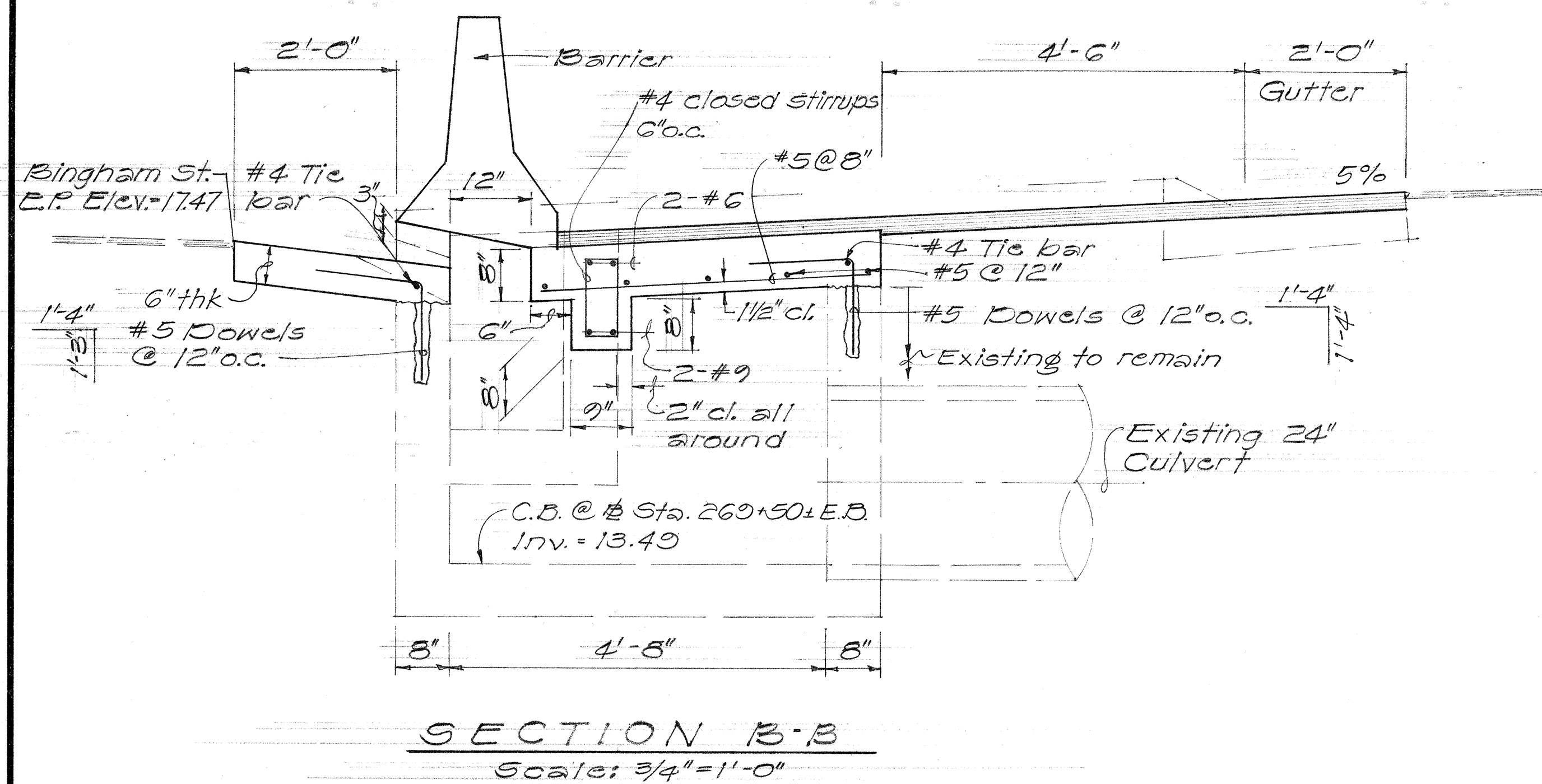
SHEET No. 17H OF 41H SHEETS

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

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



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HA-160-23	1976	82	181



C.B. @ ~~E~~ STA. 269+50±E.B., STA. 274+60±E.B., AND STA. 277+13±E.B.

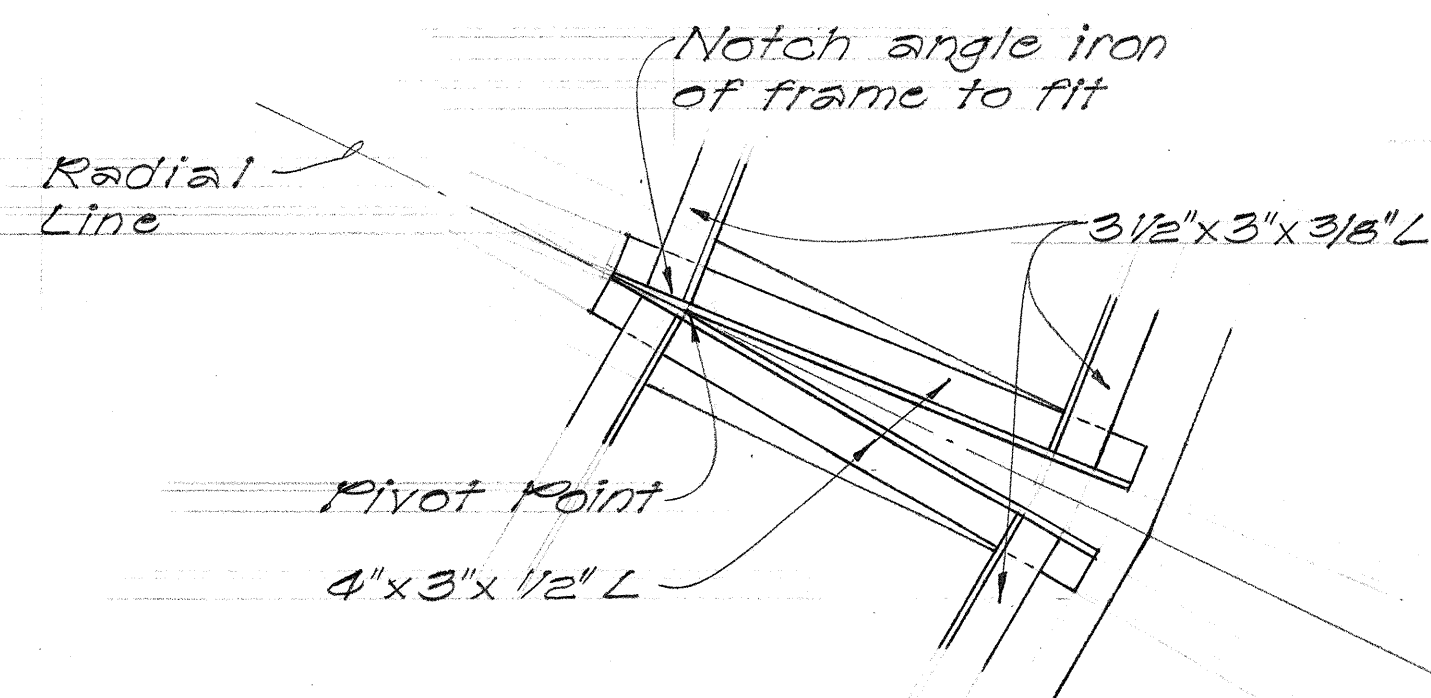
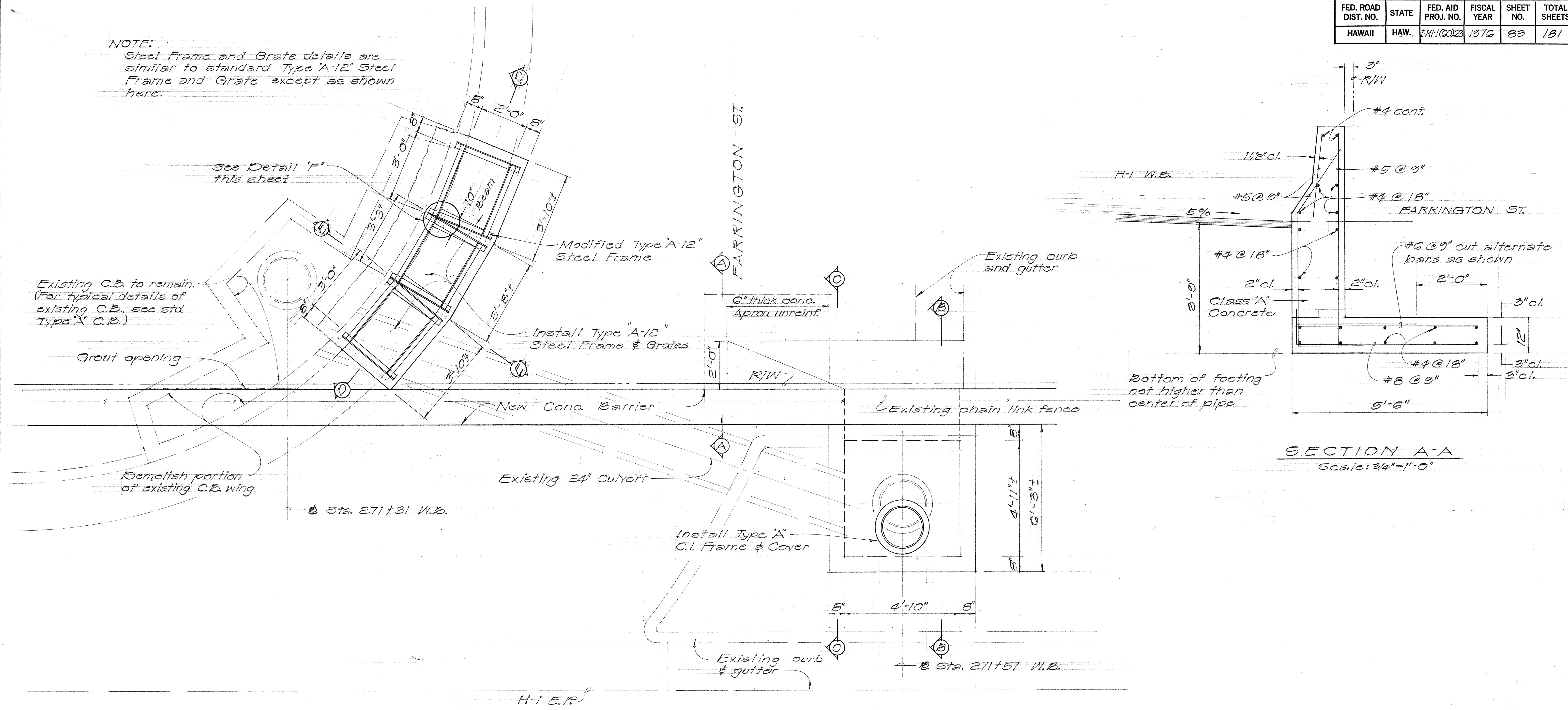
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(GO):23
Scale: As Shown Date: Aug. 1976
SHEET No. 204 OF 414 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-160:23	1976	83	181

NOTE:

Steel Frame and Grate details are similar to standard Type A-12 Steel Frame and Grate except as shown here.



DETAIL F
Scale: 1" = 1'-0"

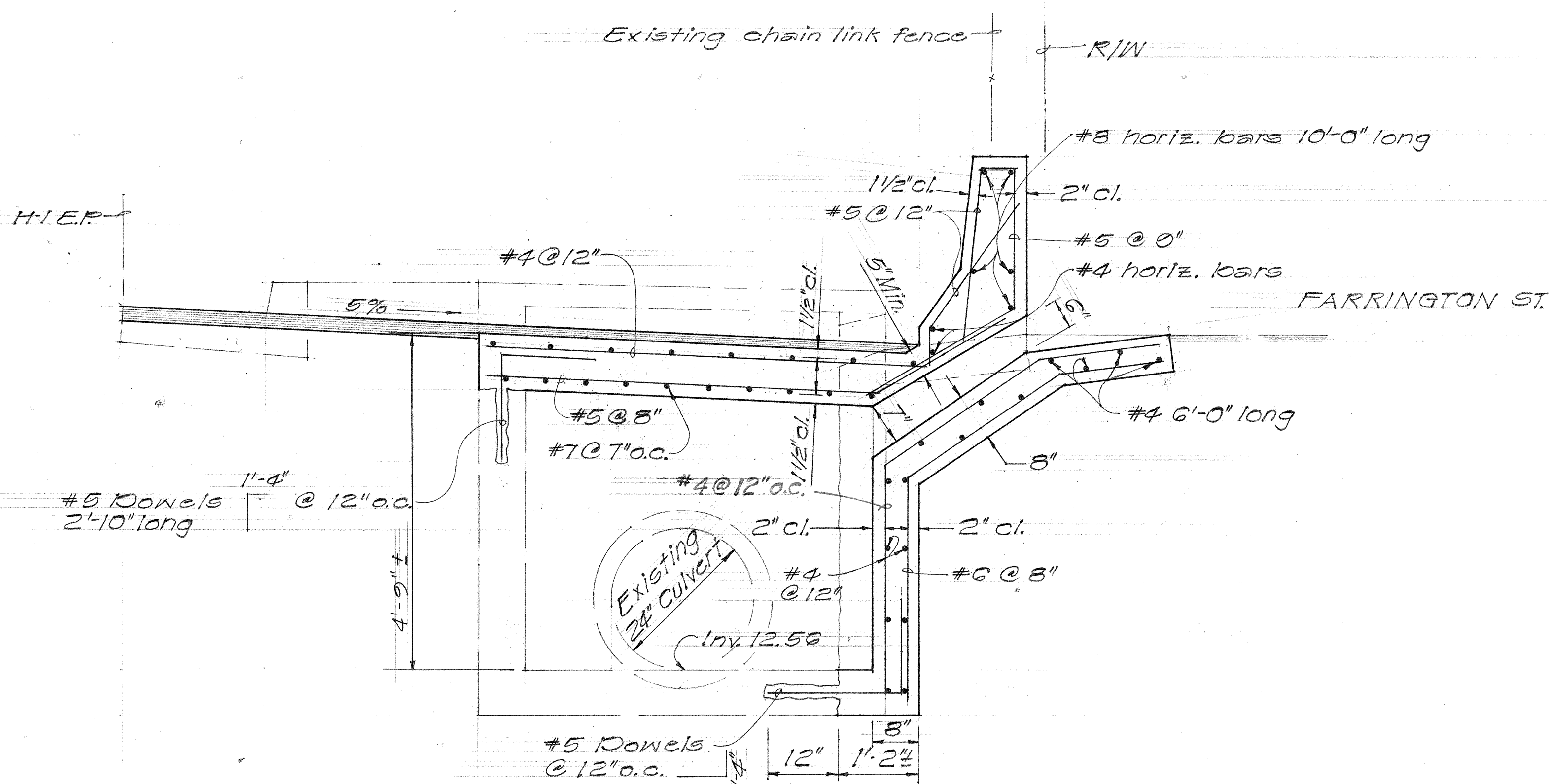
MODIFIED C.B. @ STA. 271+31 W.B. AND C.B. @ 271+57 W.B.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

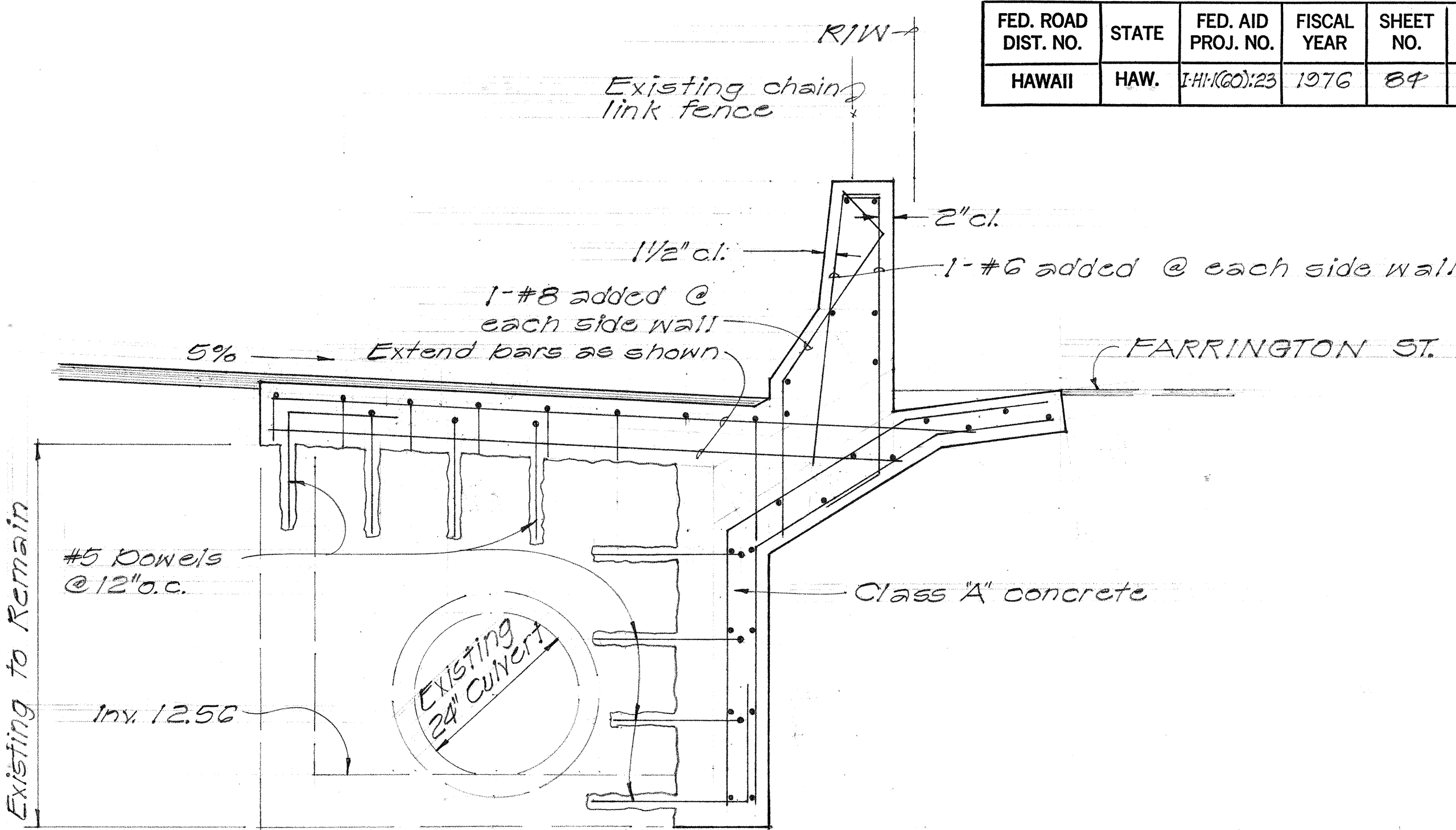
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-160:23
Scale: As Shown Date: Aug. 1976
SHEET No. 81H OF 41H SHEETS

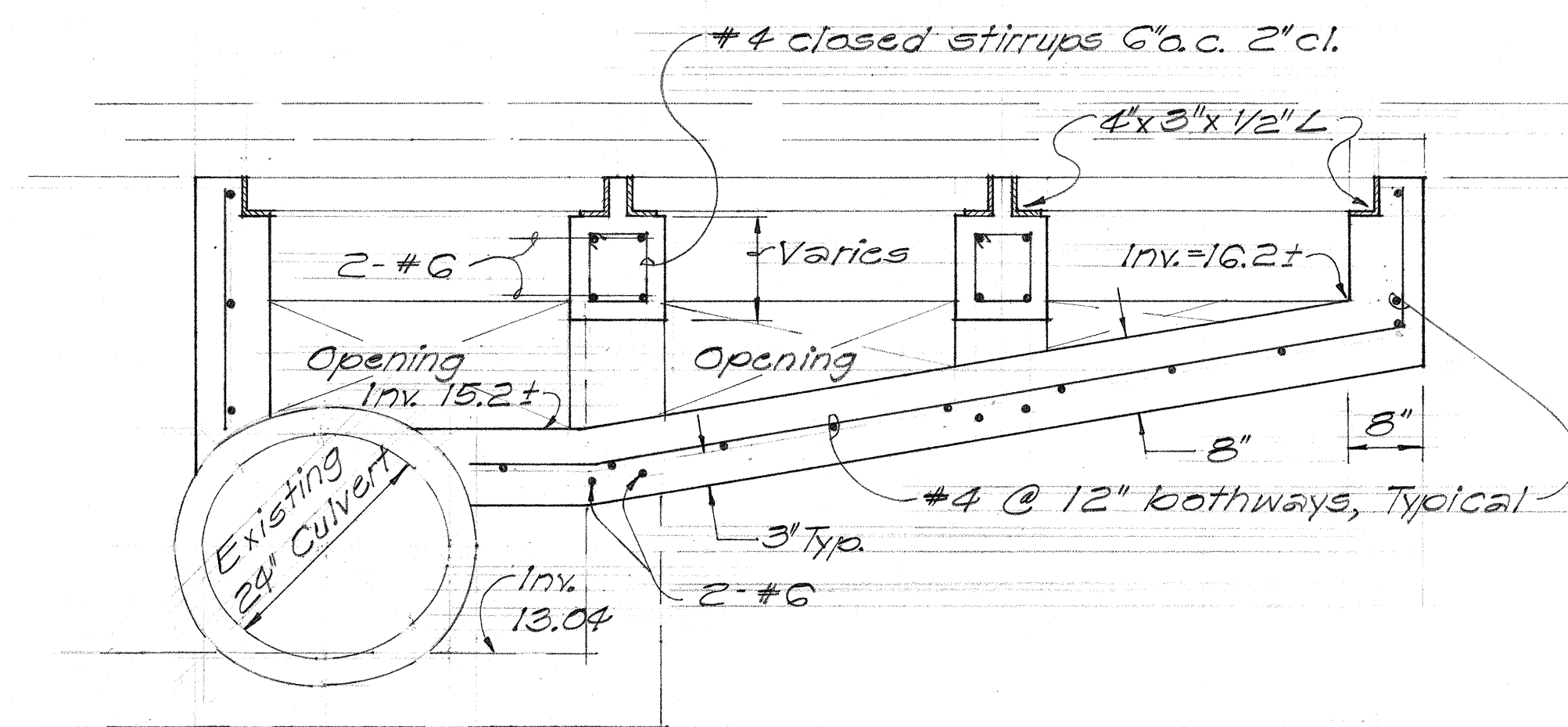
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IHI-K(20):23	1976	84	181



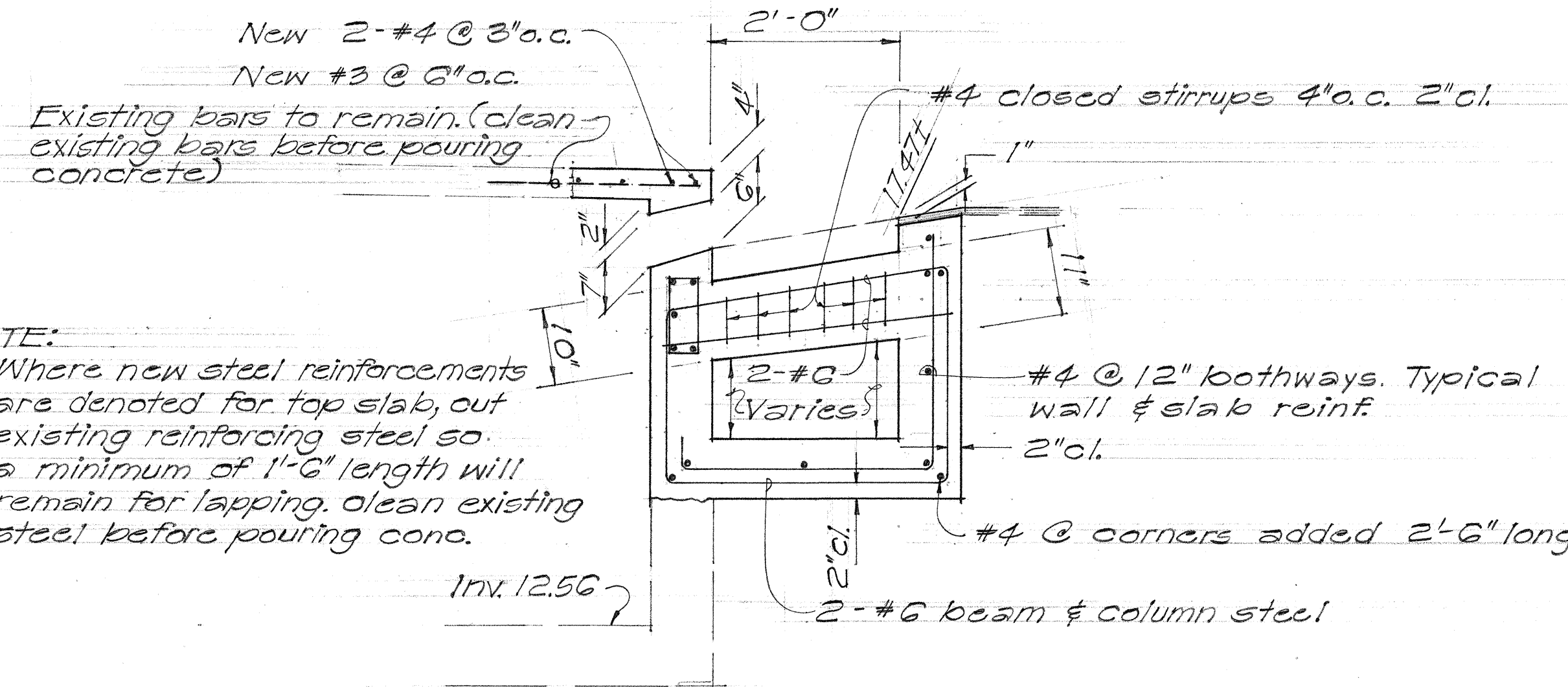
SECTION B-B
Scale: 3/4"=1'-0"



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



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



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

NOTE:
Where new steel reinforcements are denoted for top slab, cut existing reinforcing steel so a minimum of 1'-6" length will remain for lapping. Clean existing steel before pouring conc.

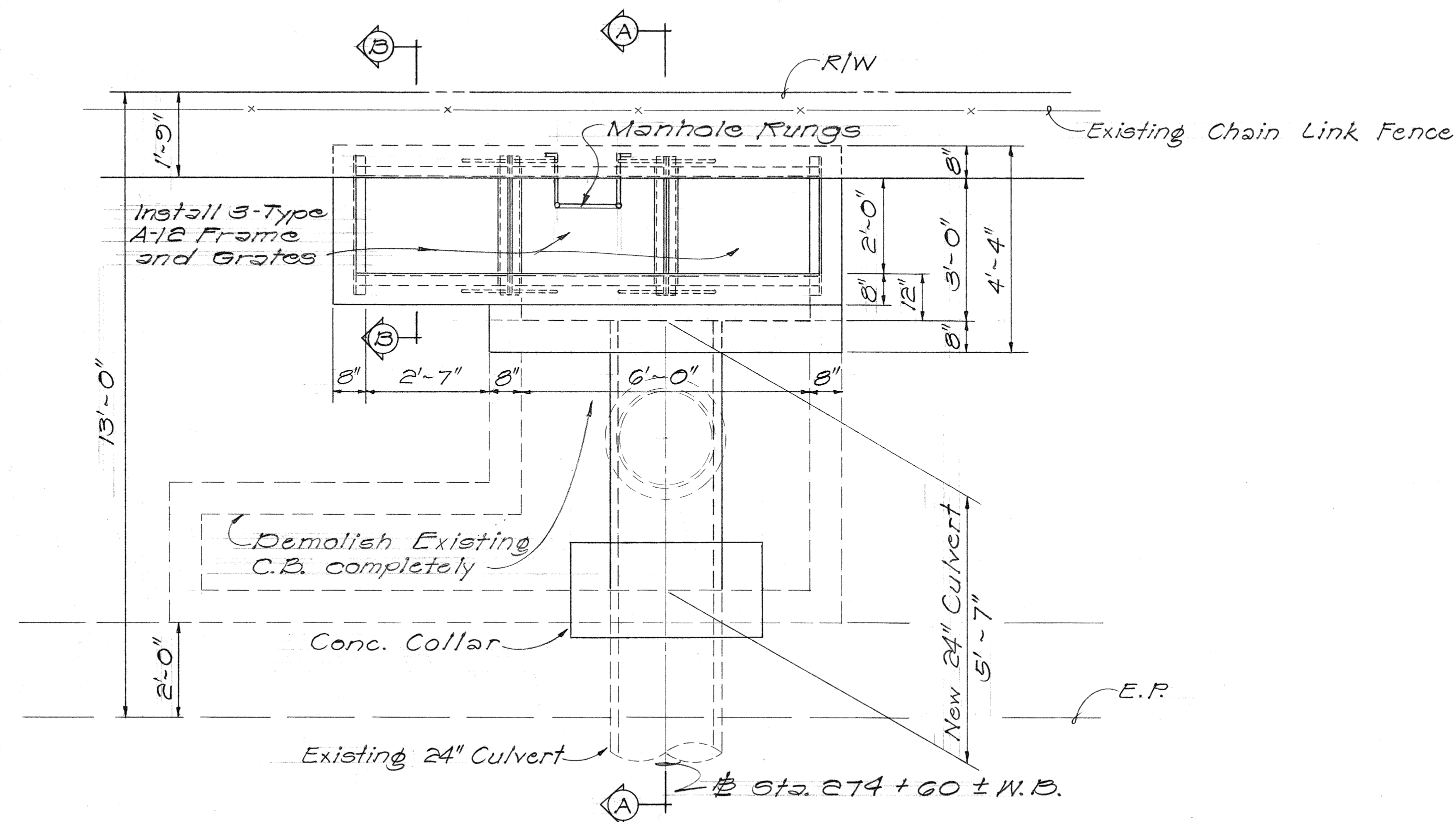
MODIFIED C.B. @ STA. 271+31 W.B. AND C.B. @ STA. 271+51 W.B.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

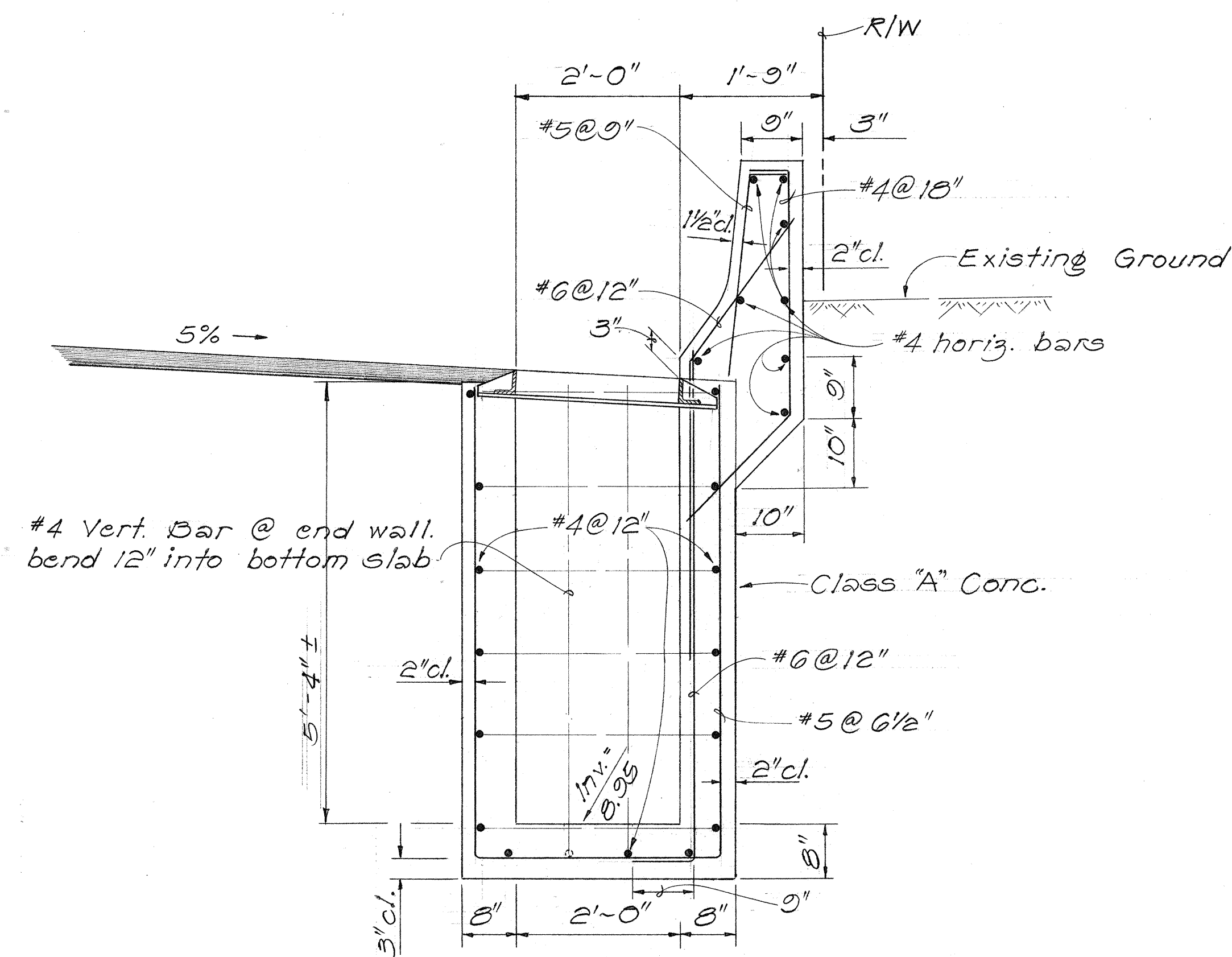
DRAINAGE DETAILS

F.A.I. Proj. No. IHI-K(20):23
Scale: As Shown Date: Aug. 1976
SHEET No. 84 OF 41 SHEETS

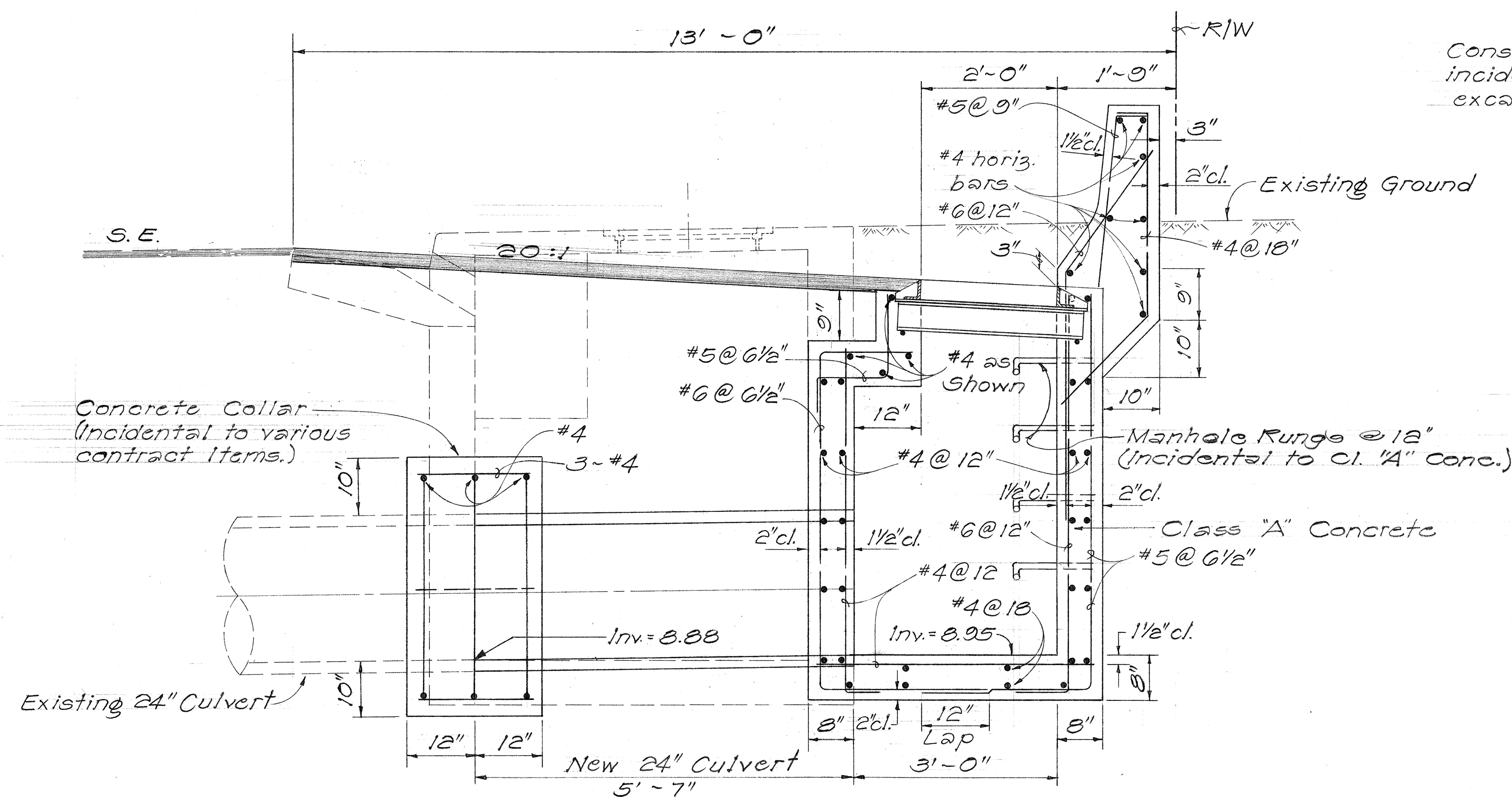
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-HI-1(60):23	1976	85	181



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

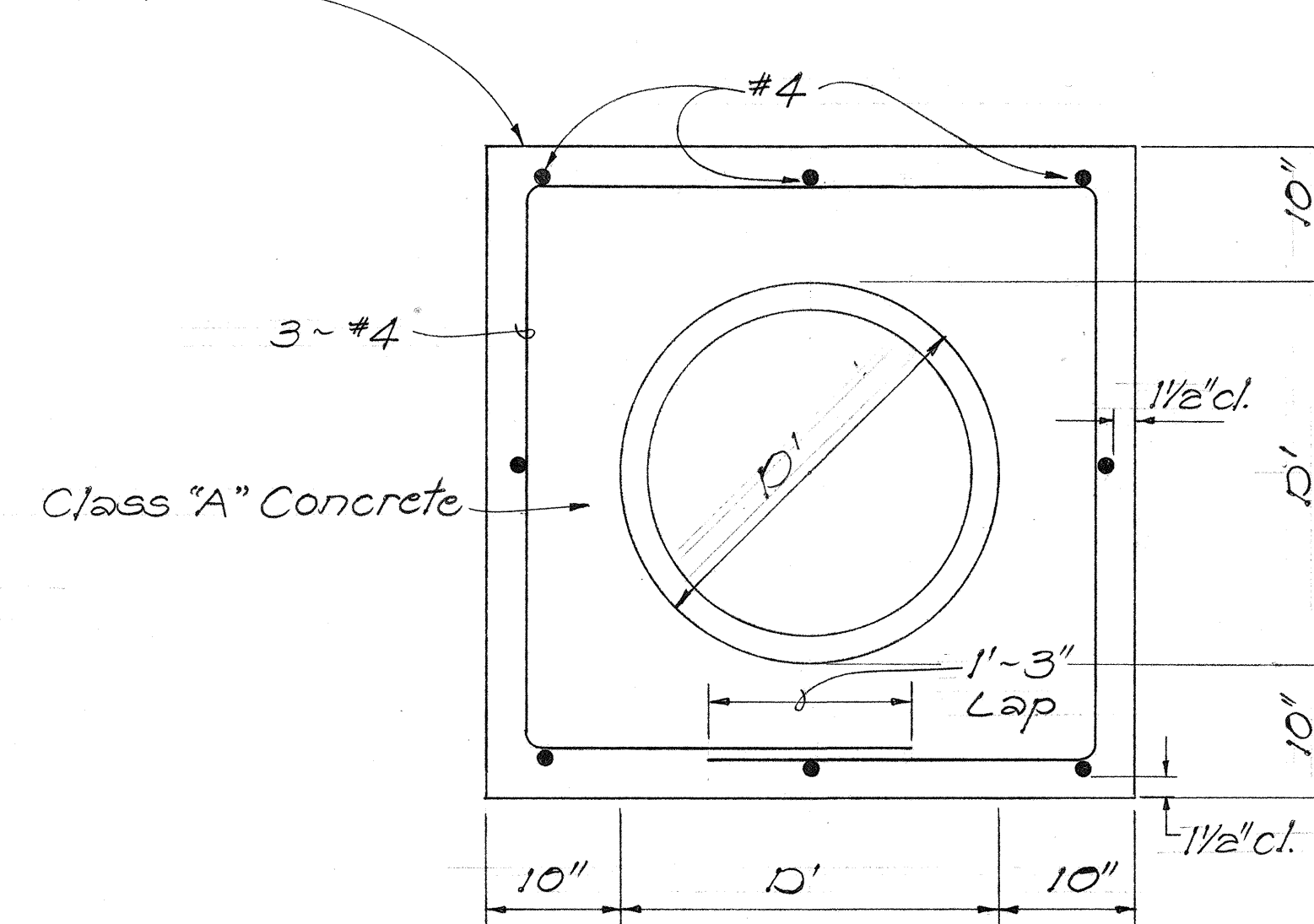


SECTION "B-B"
Scale: 3/4" = 1'-0"

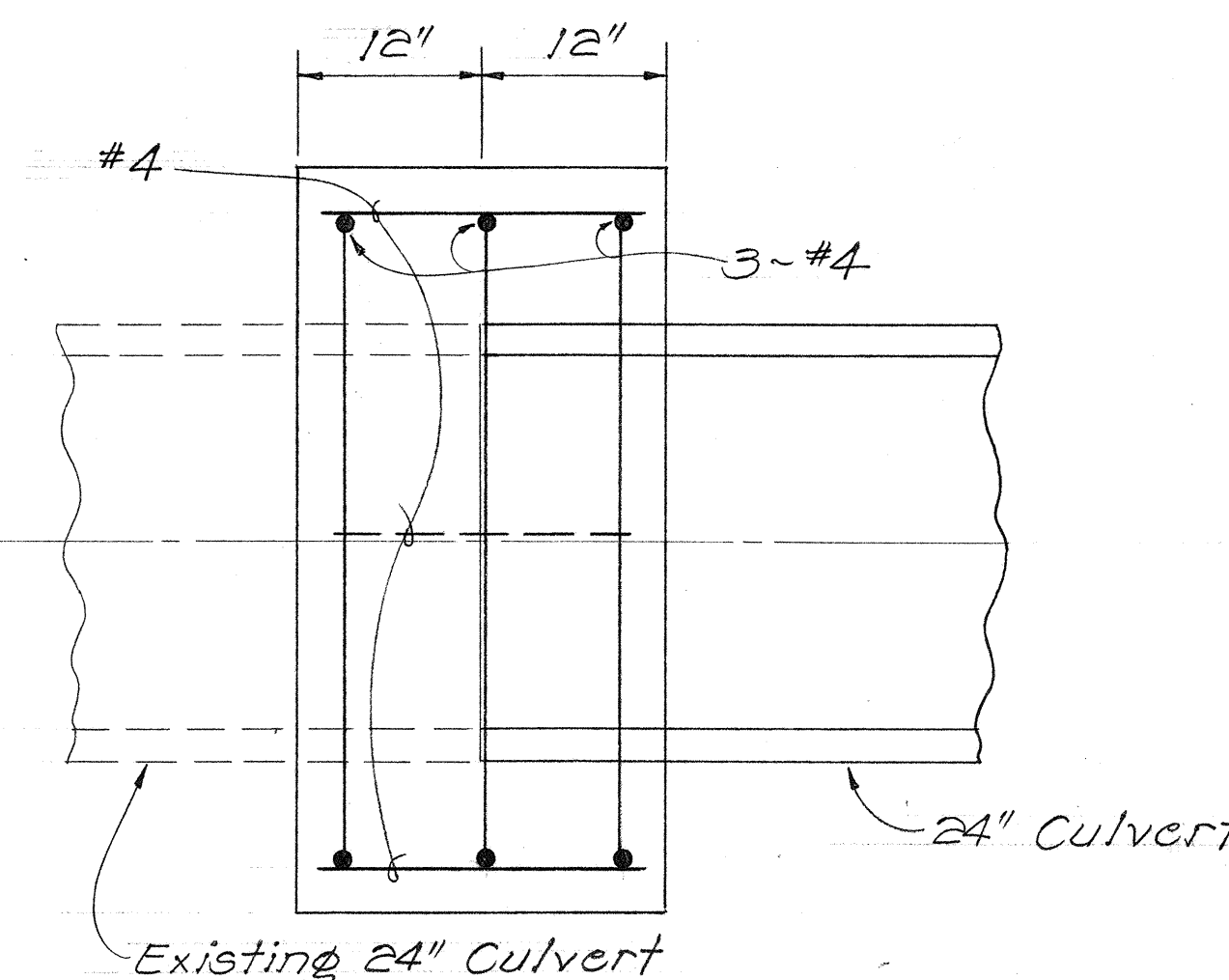


SECTION "A-A"
Scale: 3/4" = 1'-0"

Consider conc. collar incidental to structure excavation



TYPICAL REINF. CONC. COLLAR
Scale: 1" = 1'-0"

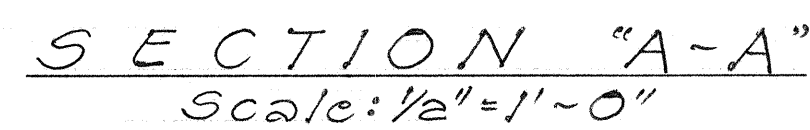
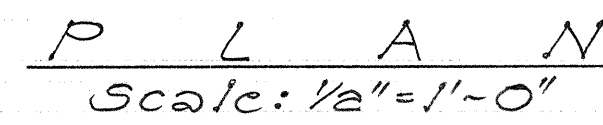


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. 1-HI-1(60):23
Scale: As Shown Date: Aug. 1976
SHEET No. 85 OF 414 SHEETS

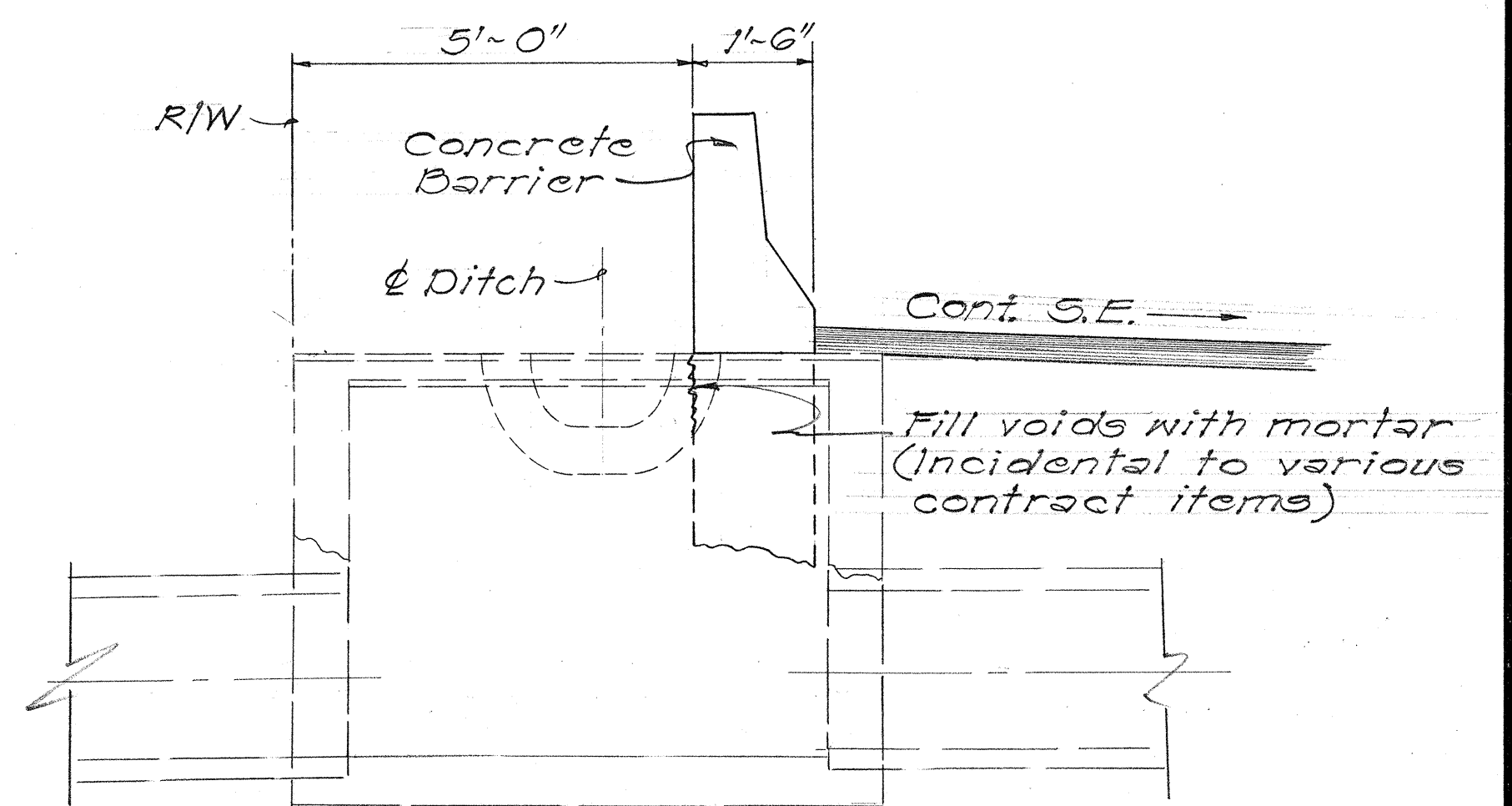
GRADED INLET @ STA. 274+60 ± W.B.

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

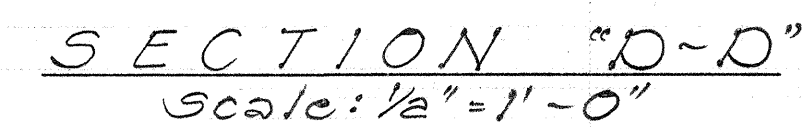


Hand-drawn structural cross-section drawing of a foundation wall and footing. The drawing shows a concrete wall and footing with various reinforcement details. Key dimensions include a footing width of 5'-6", a wall thickness of 1'-6", and a footing height of 1'-6". Reinforcement includes #4 bars at 8" spacing in the wall, #4 bars at 12" spacing in the footing, and #2 bars in the wall. A prepacked joint filler is shown at the top of the wall. The drawing is labeled "SR/W Line" and "Existing ground".

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

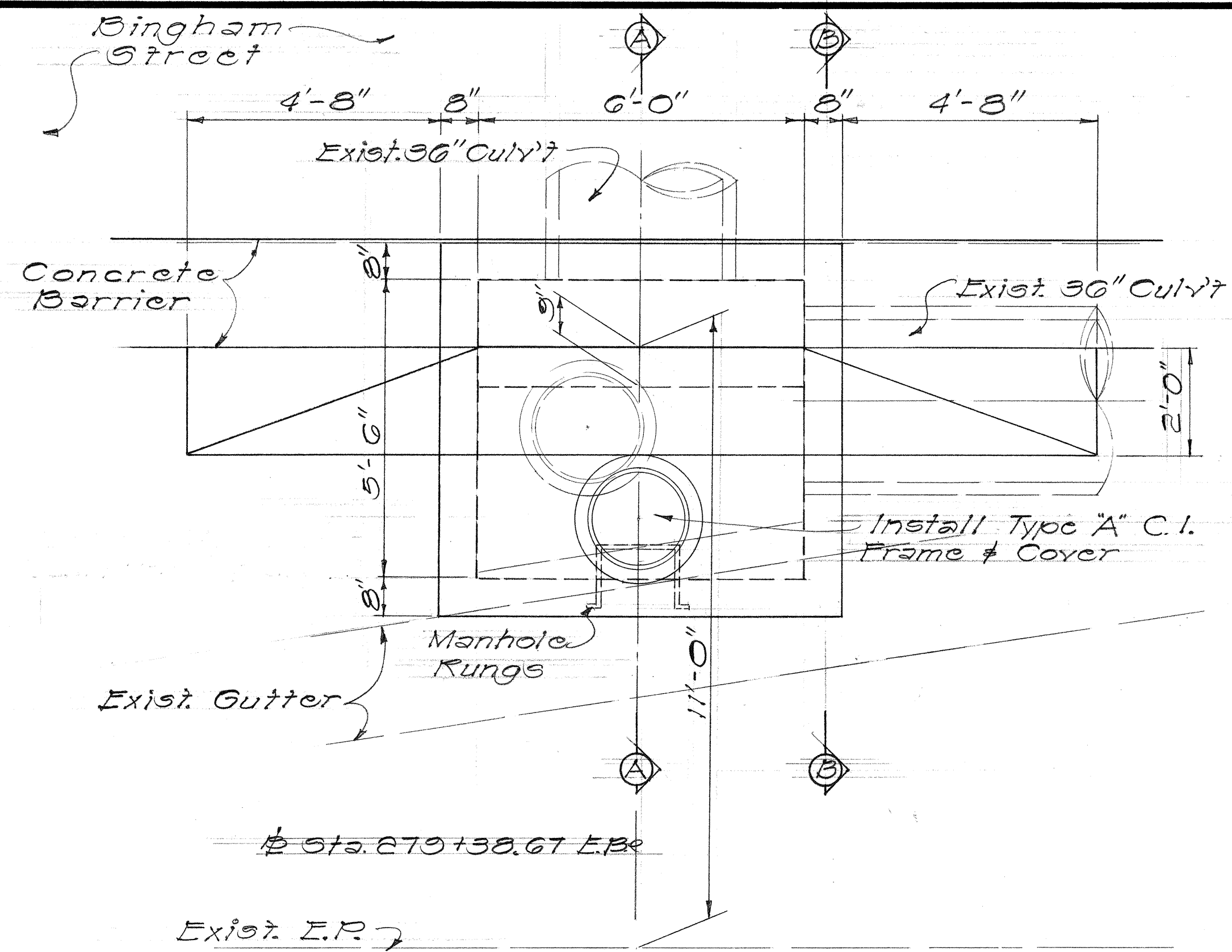


SECTION "C-C"
Scale: $1/8" = 1'-0"$

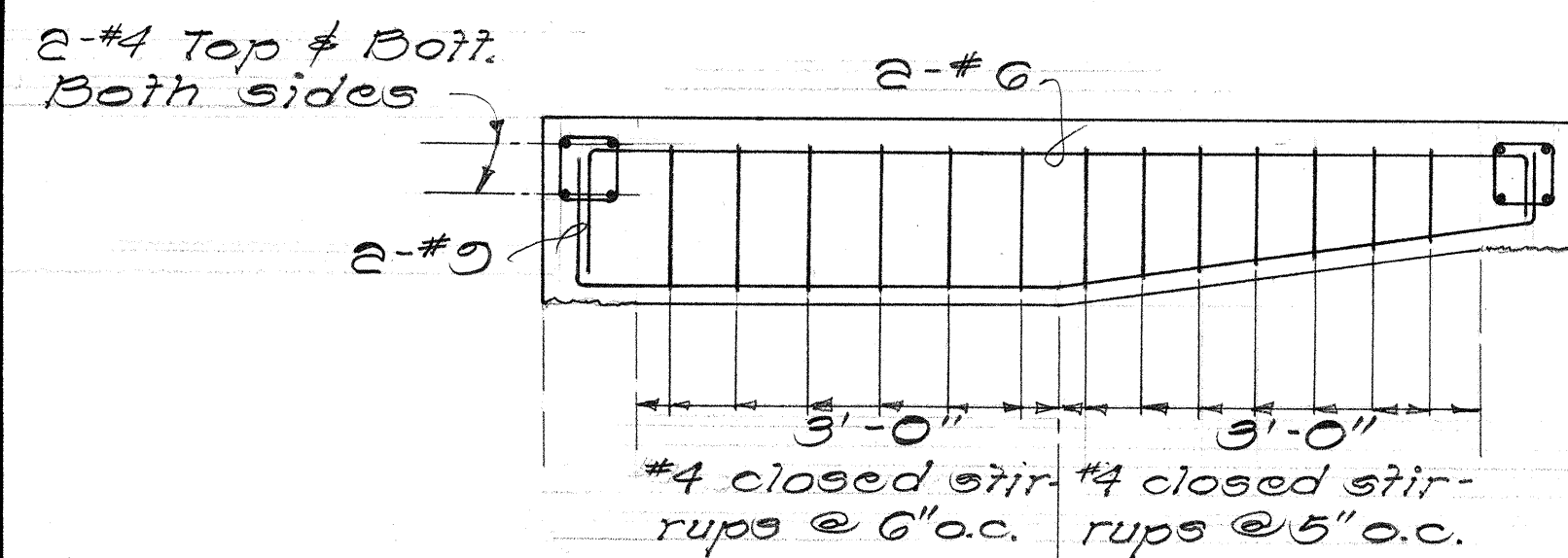


SHEET No. 24 OF 41 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	87	181

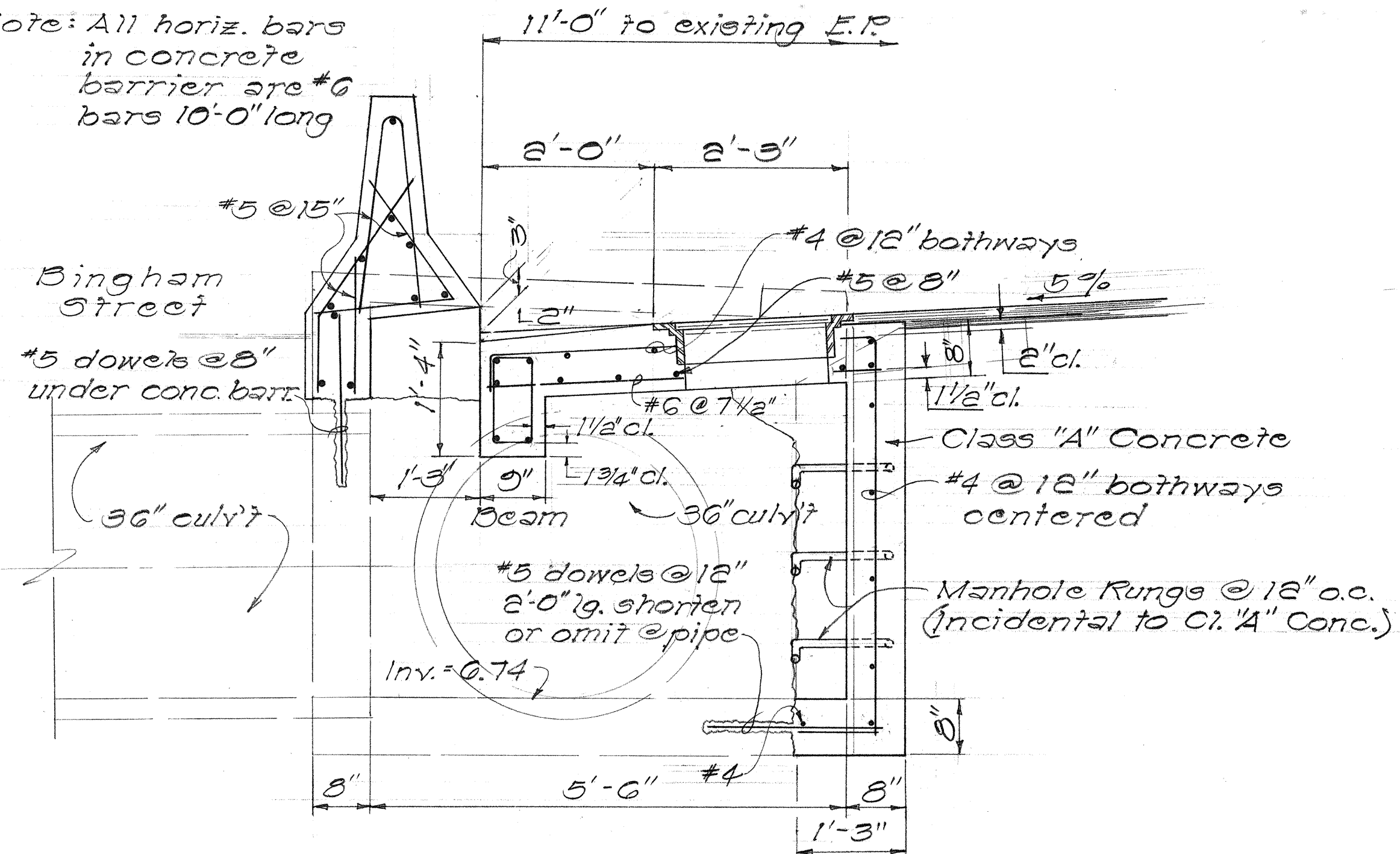


PLAN
Scale: 1/8" = 1'-0"



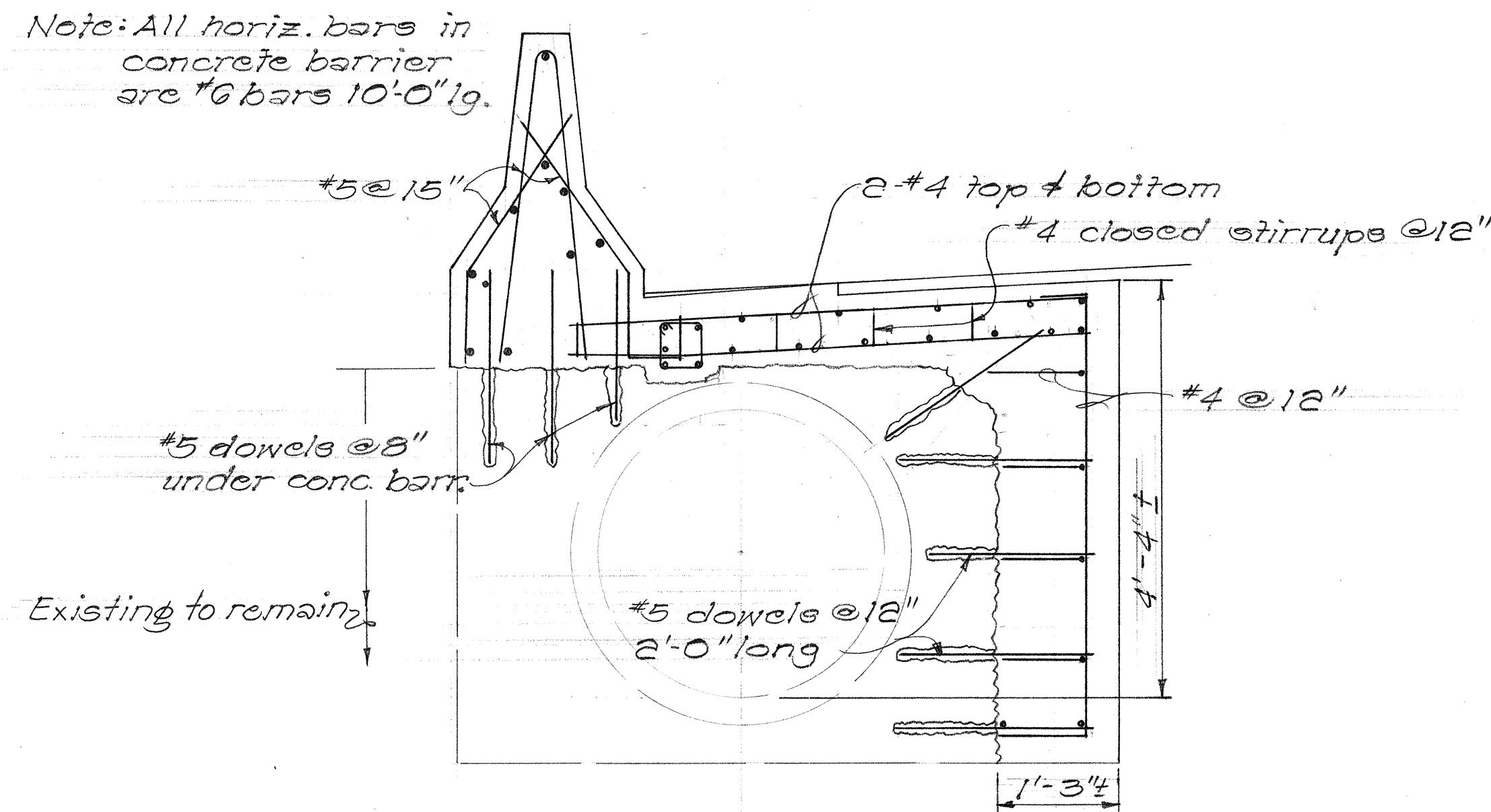
BEAM SECTION (REINFORCING)
Scale: 3/4" = 1'-0"

Note: All horiz. bars in concrete barrier are #6 bars 10'-0" long



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

Note: All horiz. bars in concrete barrier are #6 bars 10'-0" long



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

C.B. @ STA. 279+38.67 E.B.

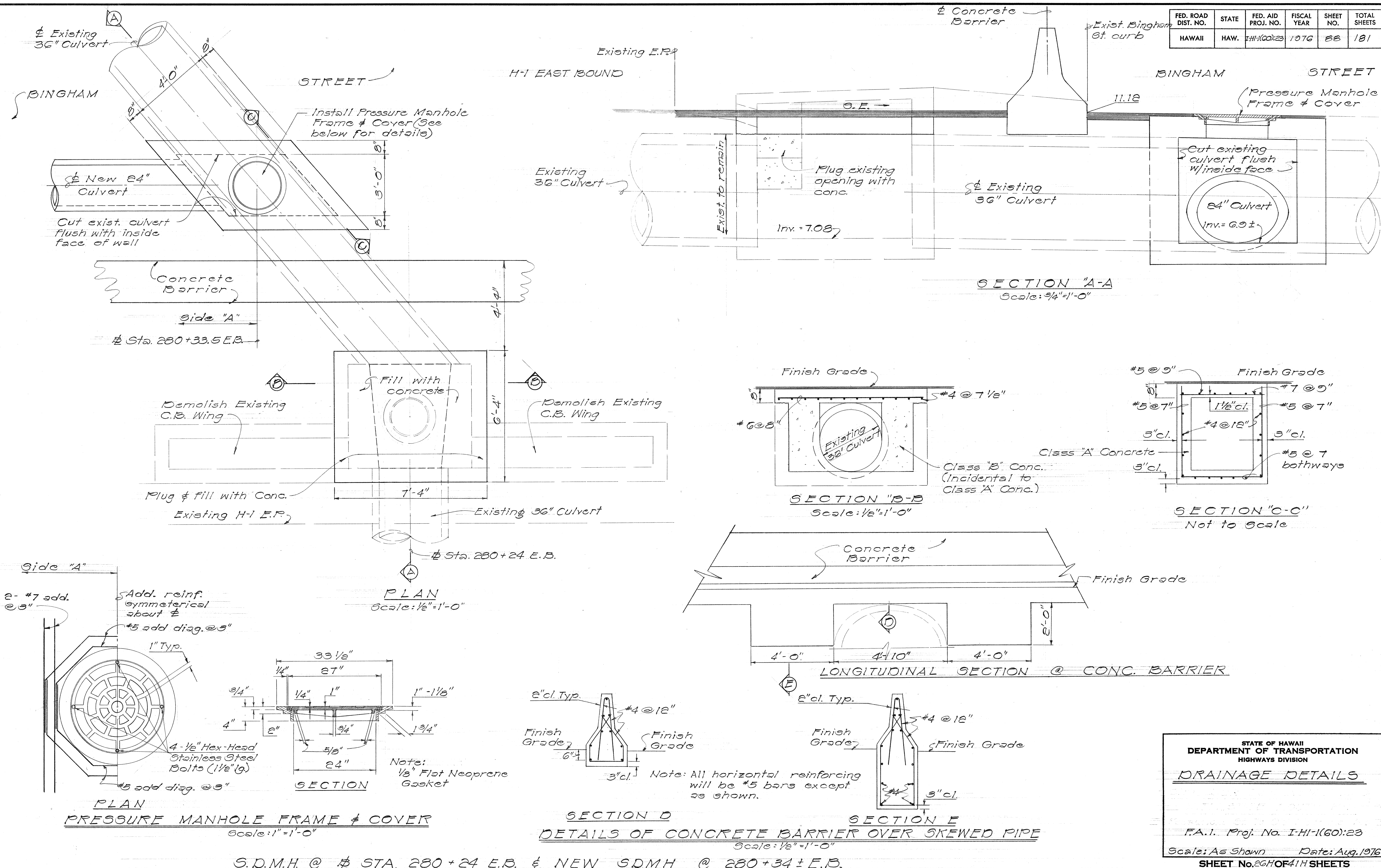
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60):23

Scale: As Shown Date: Aug. 1976

SHEET NO. 254 OF 41 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	88	181



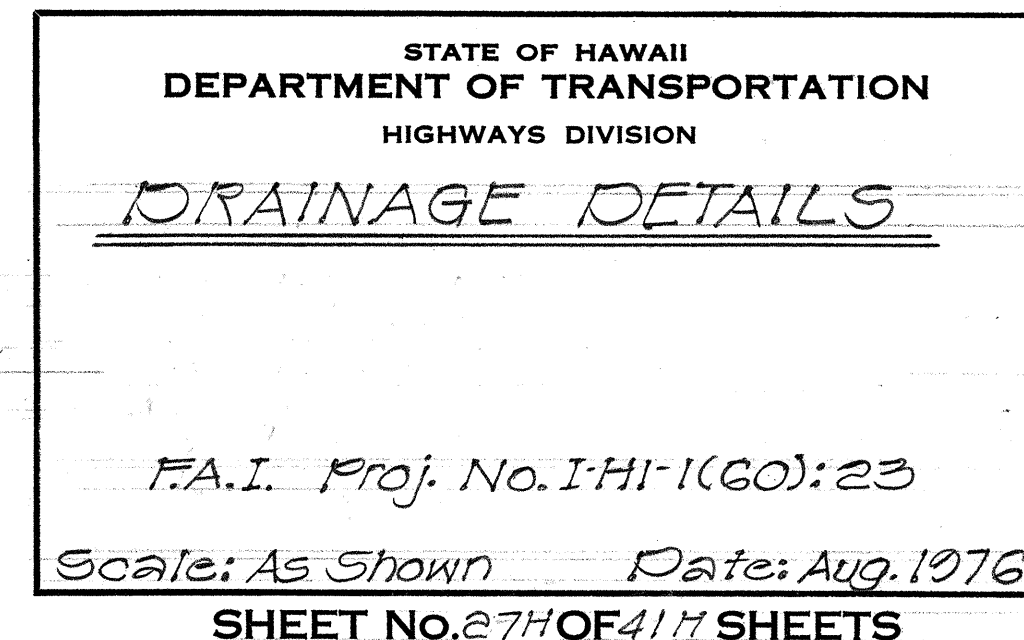
DATE	DESIGNED BY	CHECKED BY
PLAN	DESIGNED BY	CHECKED BY
NOTE BOOK	DESIGNED BY	CHECKED BY
NO.	DESIGNED BY	CHECKED BY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

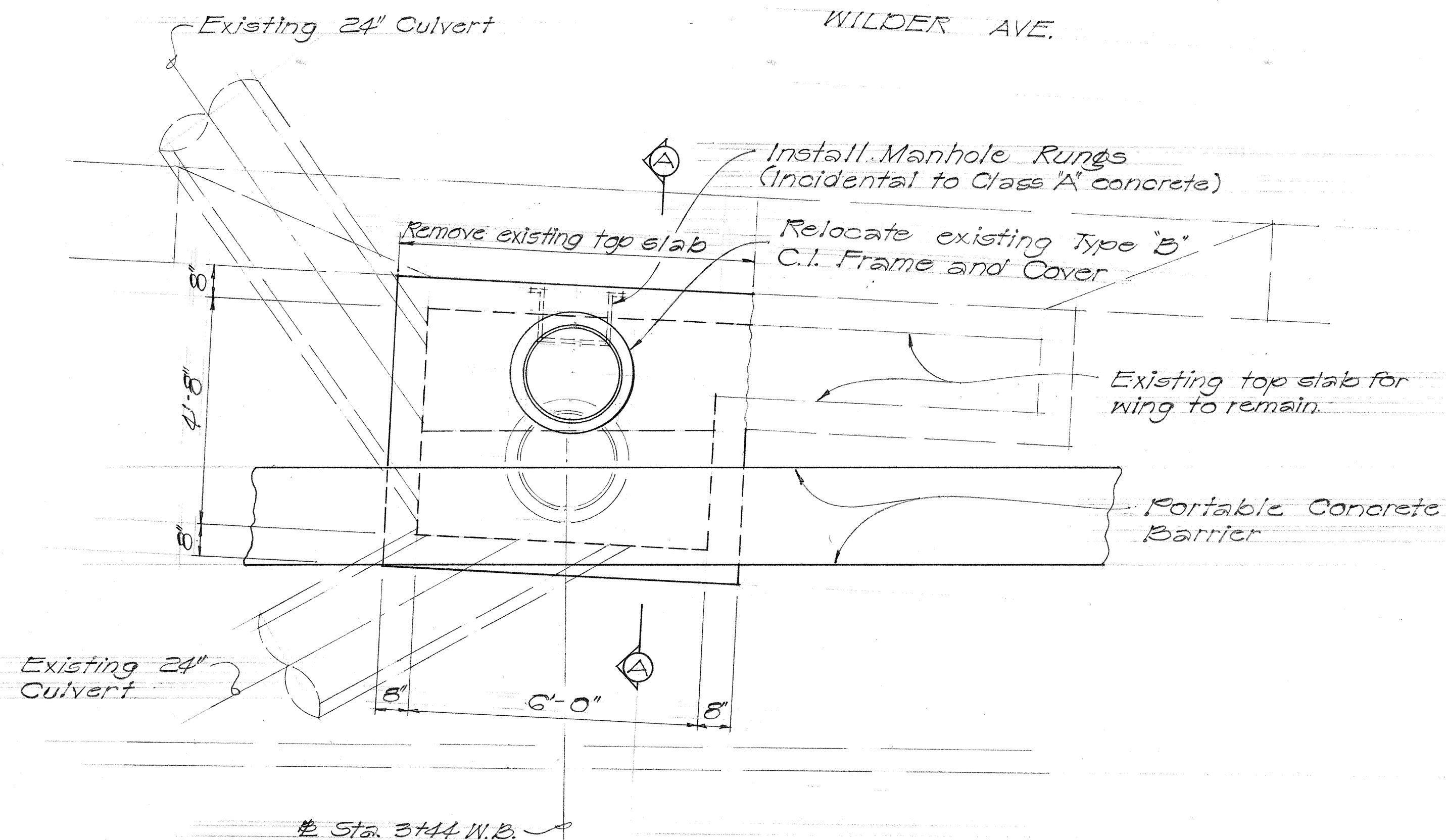
DRAINAGE DETAILS

F.A.1. Proj. No. I-HI-1(60):23
Scale: As Shown Date: Aug. 1976
SHEET No. 88 OF 414 SHEETS

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

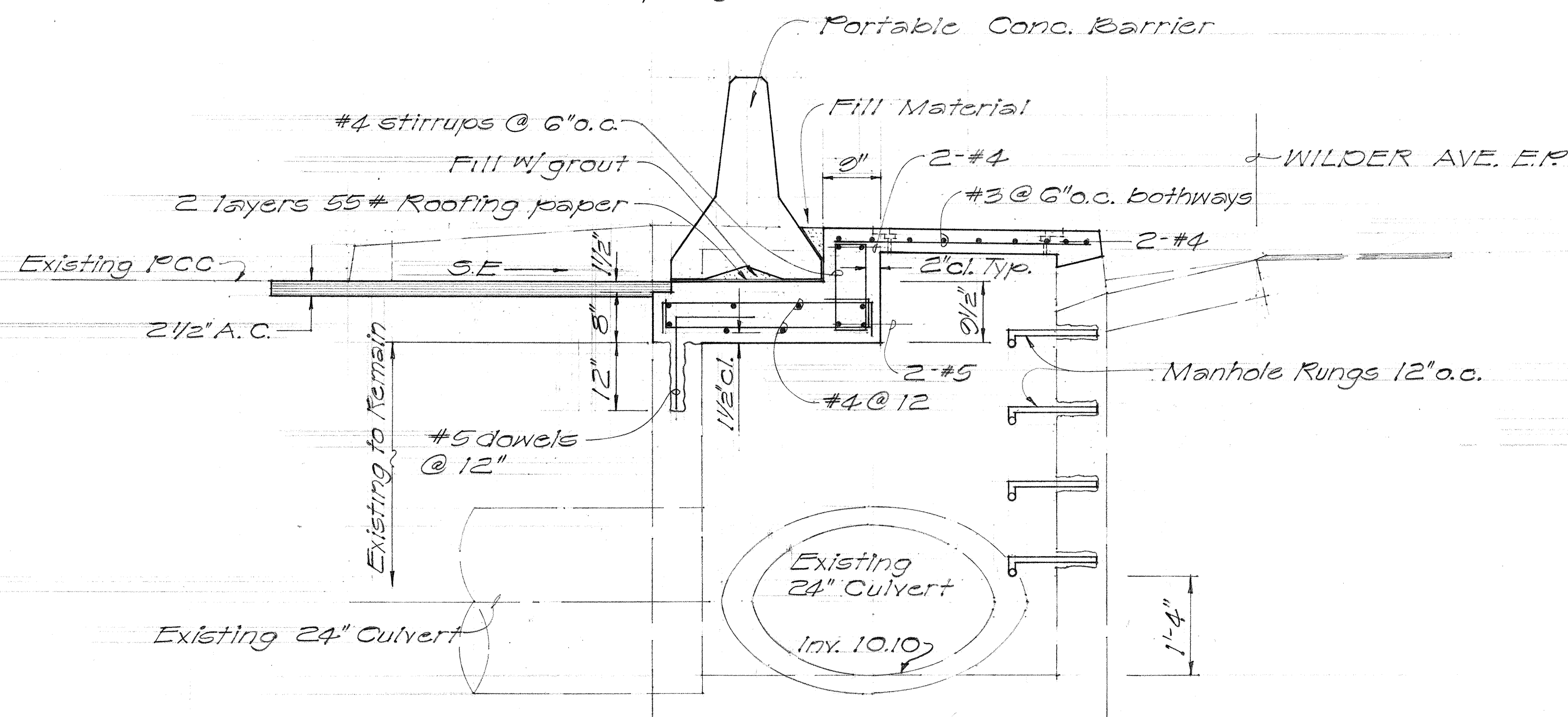


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (60):23	1976	20	181



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

- NOTE:**
1. Existing reinforcing steel shall be cleaned before pouring concrete. For top slab, existing steel shall be cut 1'-6" beyond the remaining slab for lapping with new reinforcement.
 2. For details of top slab and throat opening, see std. C.B.



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

MODIFIED C.B. @ STA. 3+44 W.B.

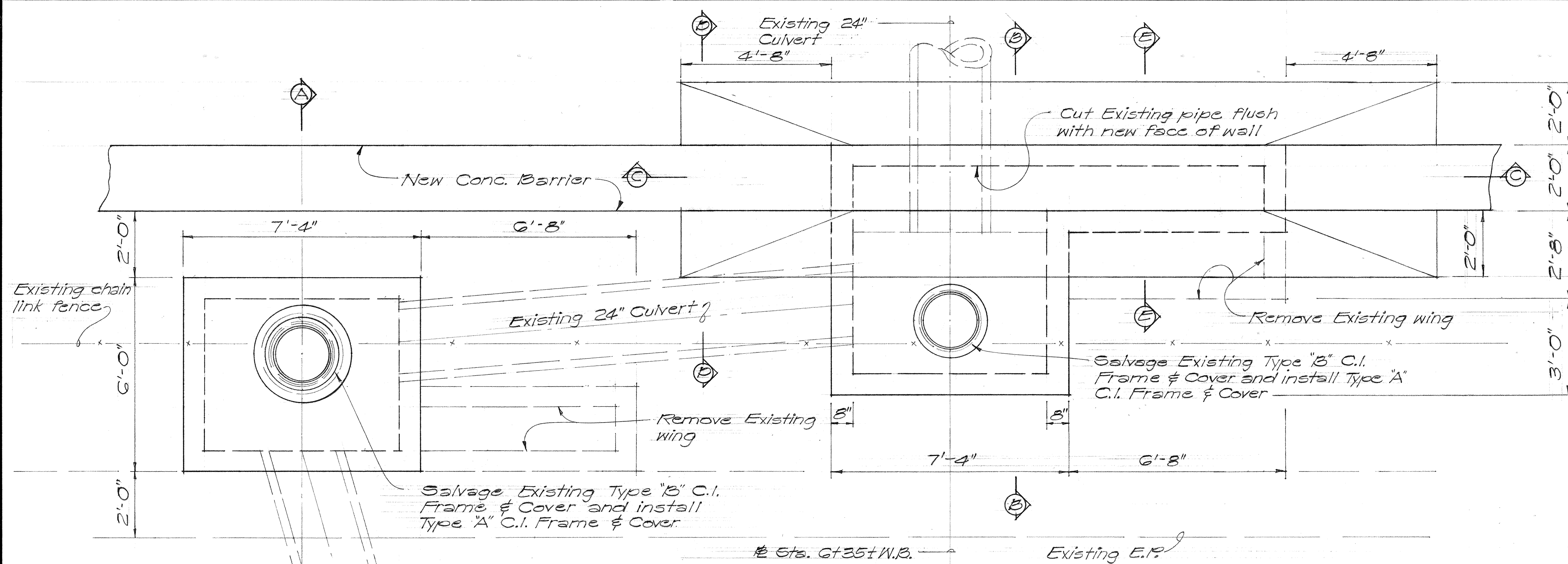
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

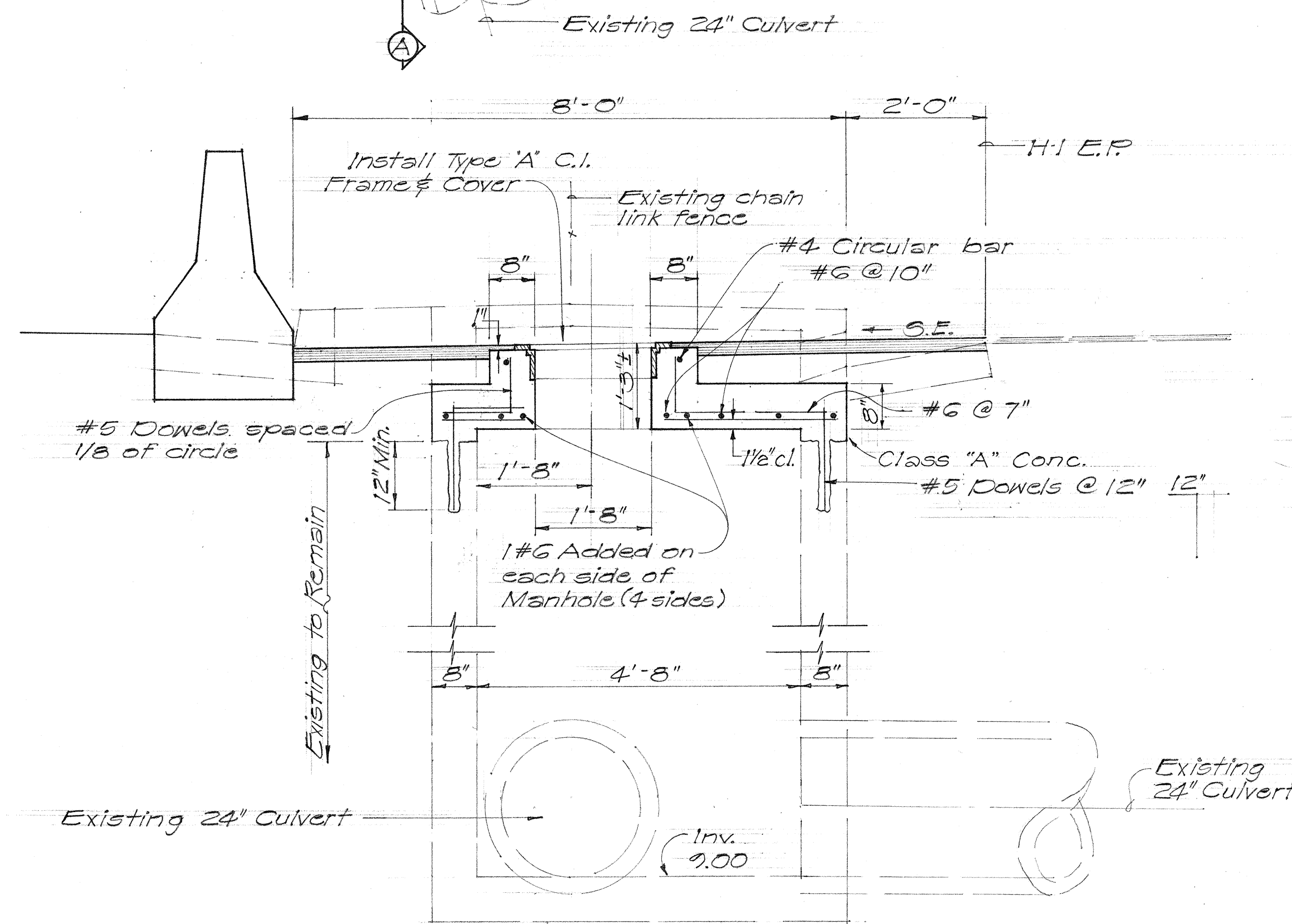
F.A.I. Proj. No. I-HI-1(60):23
Scale: As Shown Date: Aug. 1976
SHEET No. 204 OF 417 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (60):83	1976	01	181

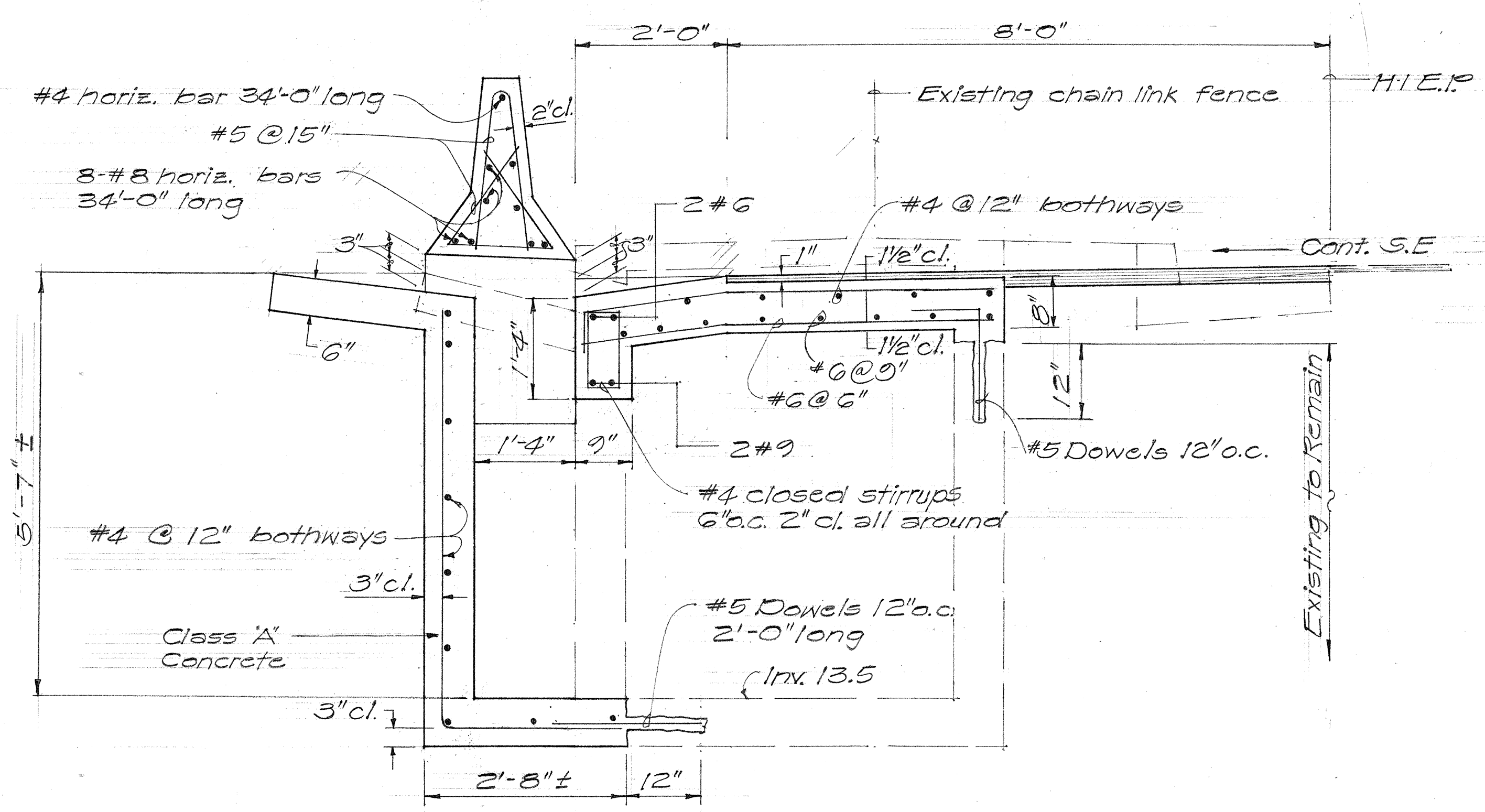


Note: For Sections C, D, & E
See sht. No. 31H

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



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



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

C.D. @ # STA. G+35± W.B.

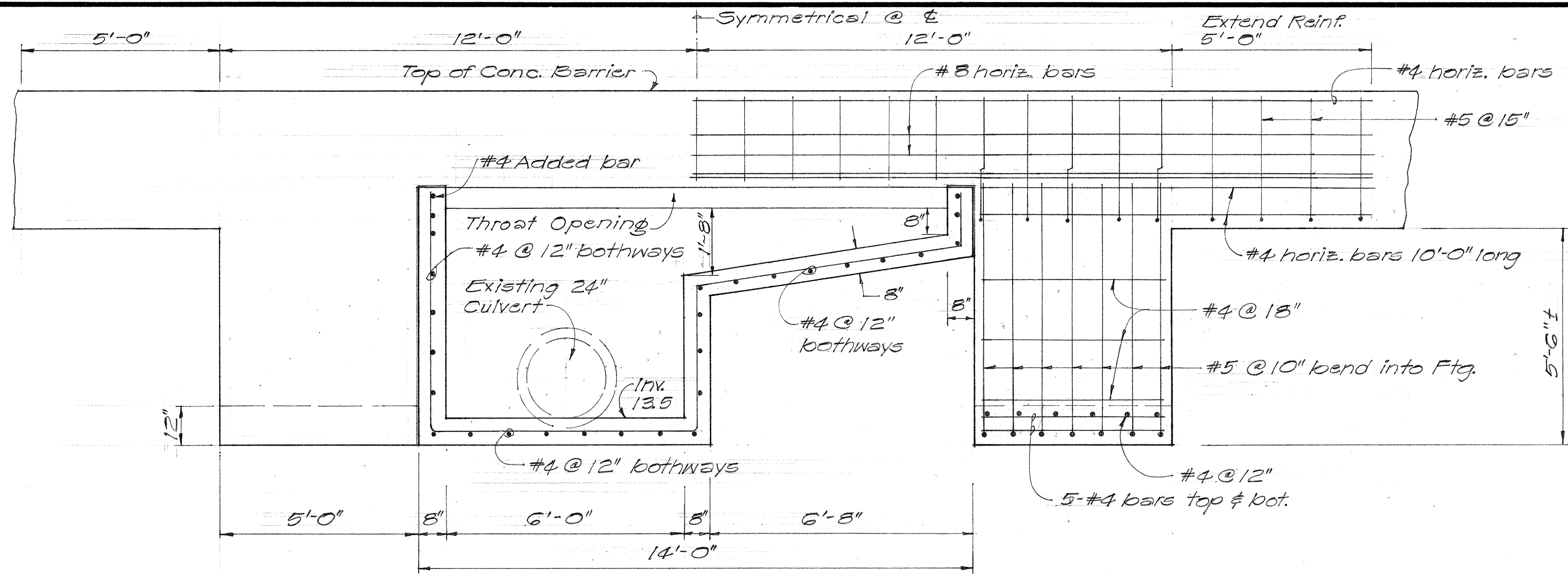
S.D.M.H. @ # STA. G+15± W.B.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

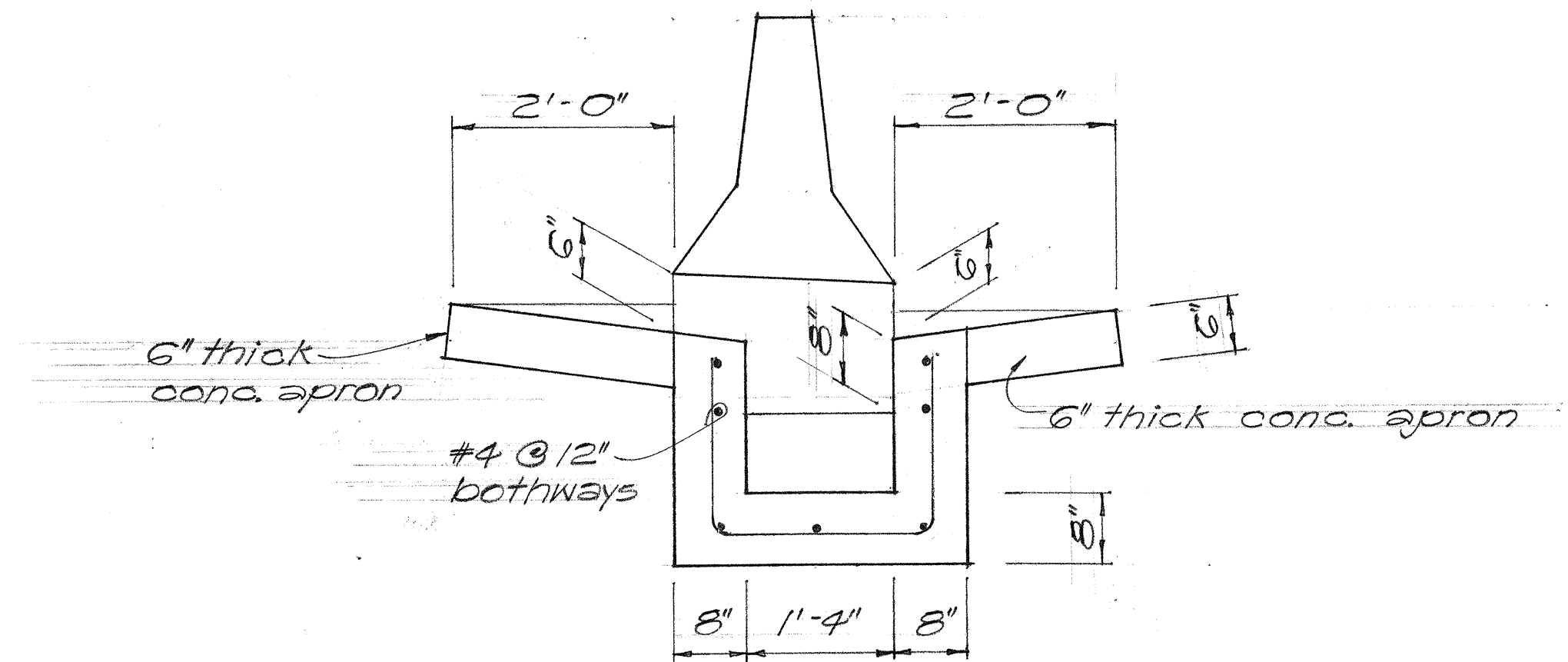
F.A.I. Proj. No. I-HI-1(60):83
Scale: As Shown Date: Aug. 1976
SHEET No. 01 OF 41 H SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
CHECKED BY	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (60)23	1976	92	181

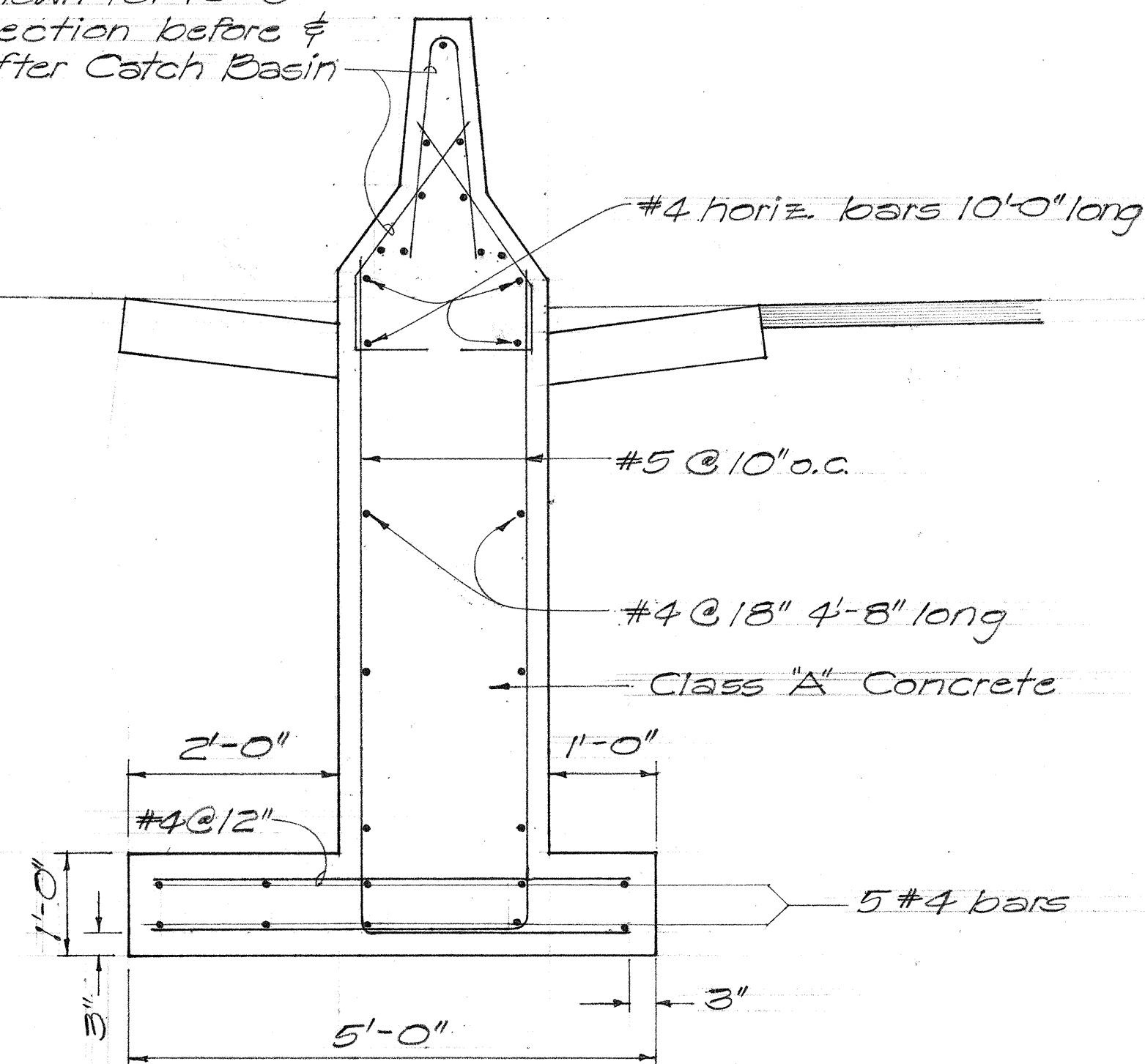


SECTION C-C
Scale: 1/2" = 1'-0"



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

#5 @ 15" o.c. As shown for 10'-0"
Section before & after Catch Basin



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

C.B. @ STA. 6+35 ± W.D.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

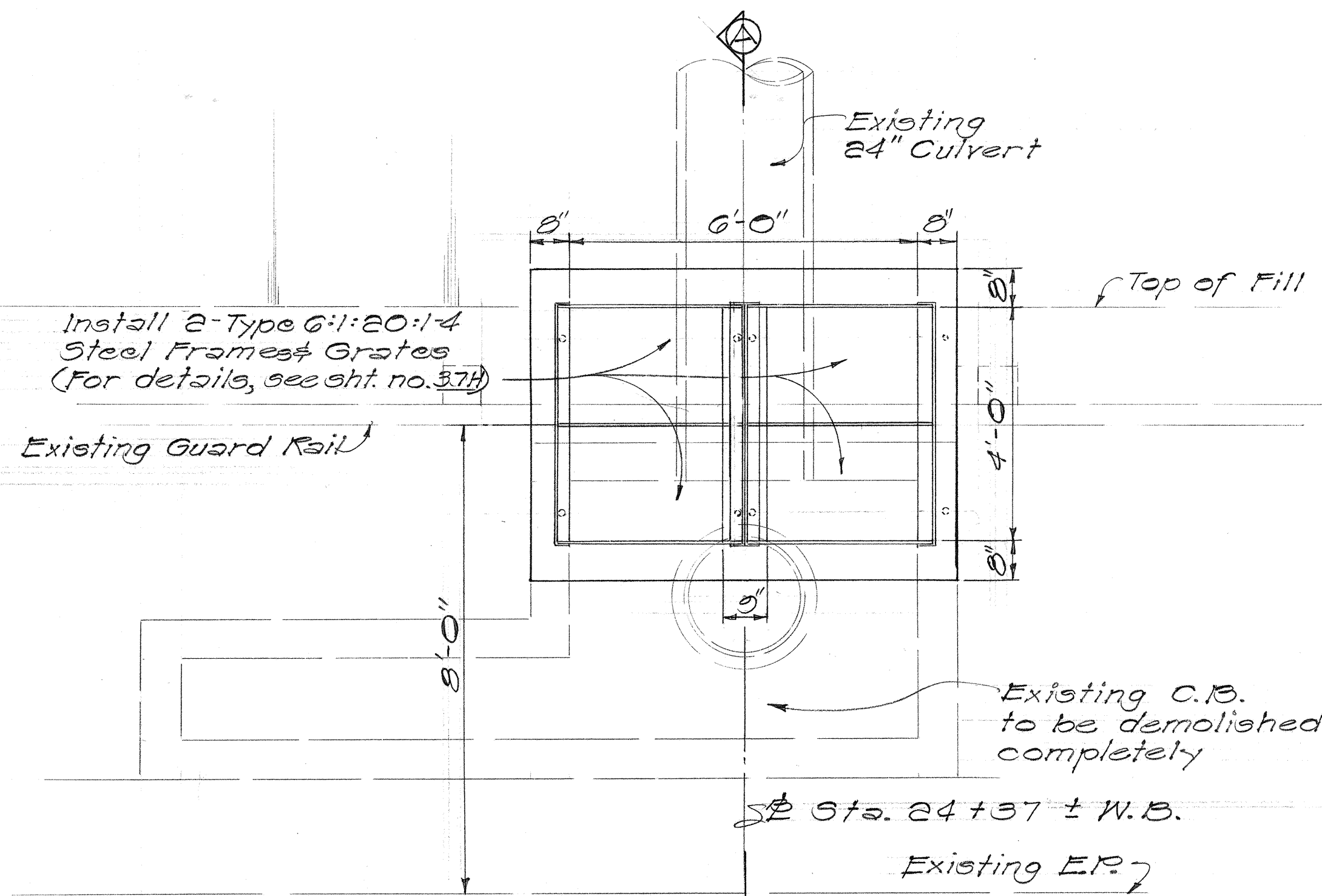
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60):23

Scale: As Shown Date: Aug., 1976

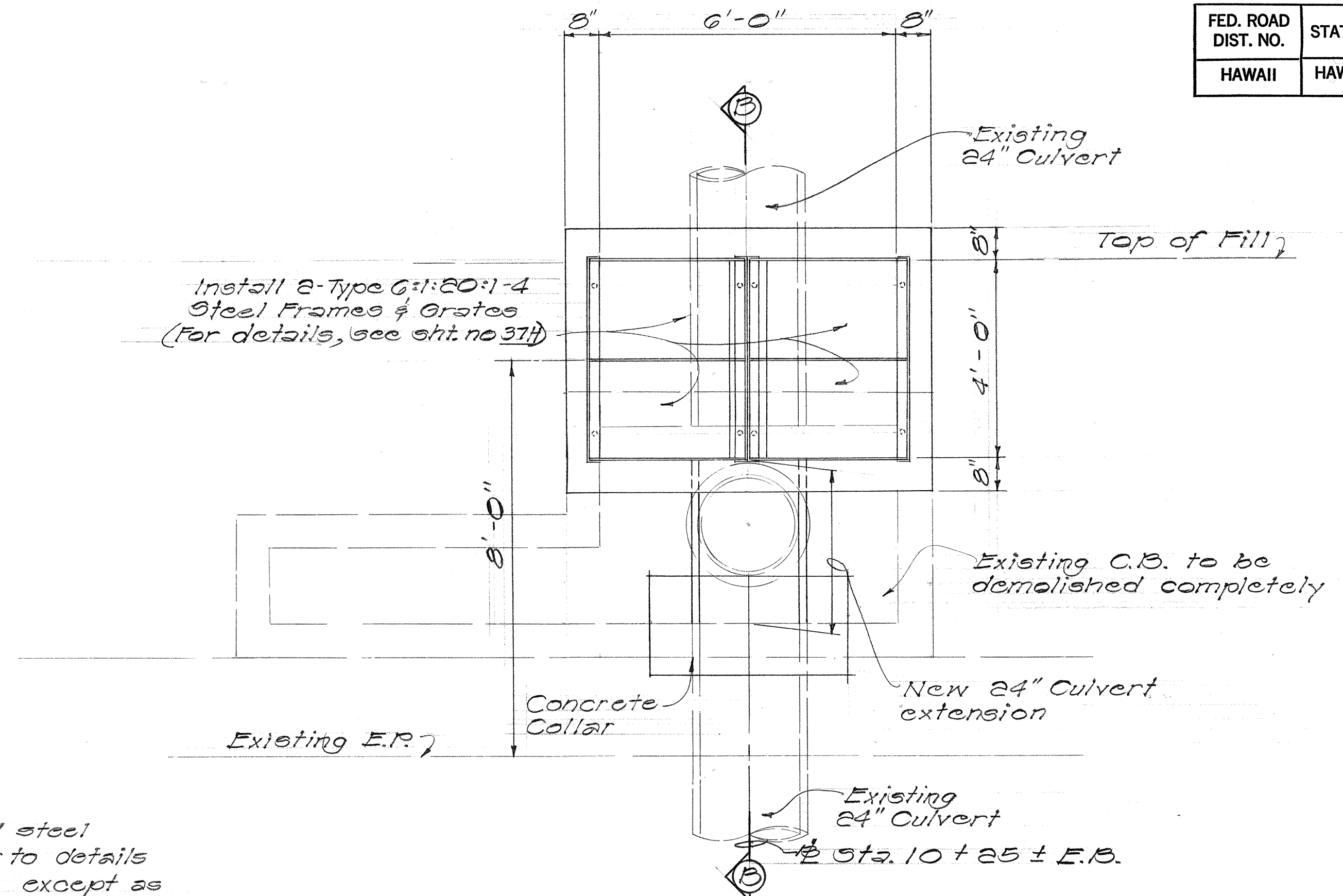
SHEET No. 304 OF 414 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	23	181

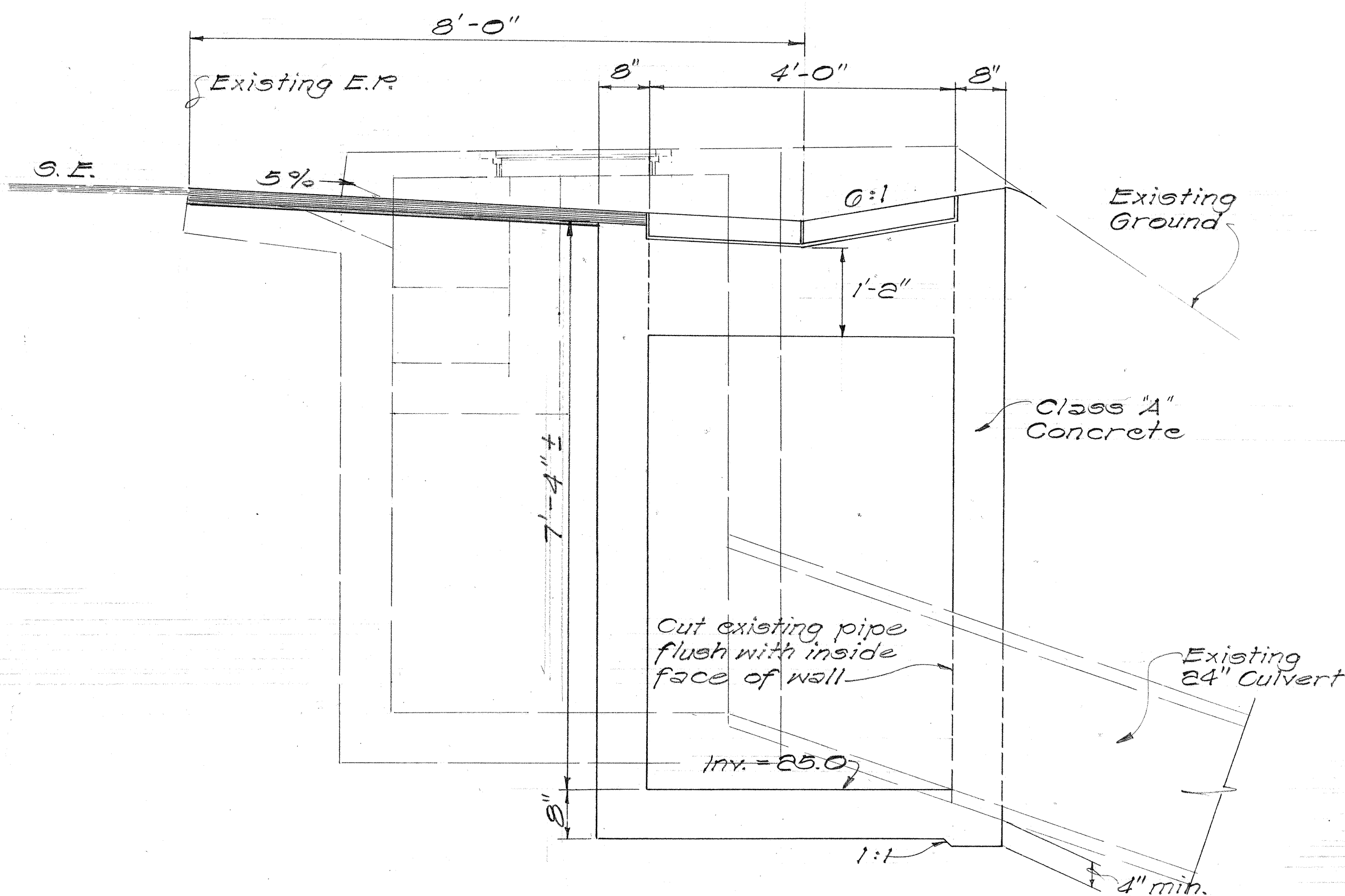


PLAN
Scale: 1/2" = 1'-0"

NOTE:
All notes, dimensions, and steel reinf. layouts are similar to details of Grated Drop Intake except as shown or noted on this sht. (For details see sht. no. 37H)

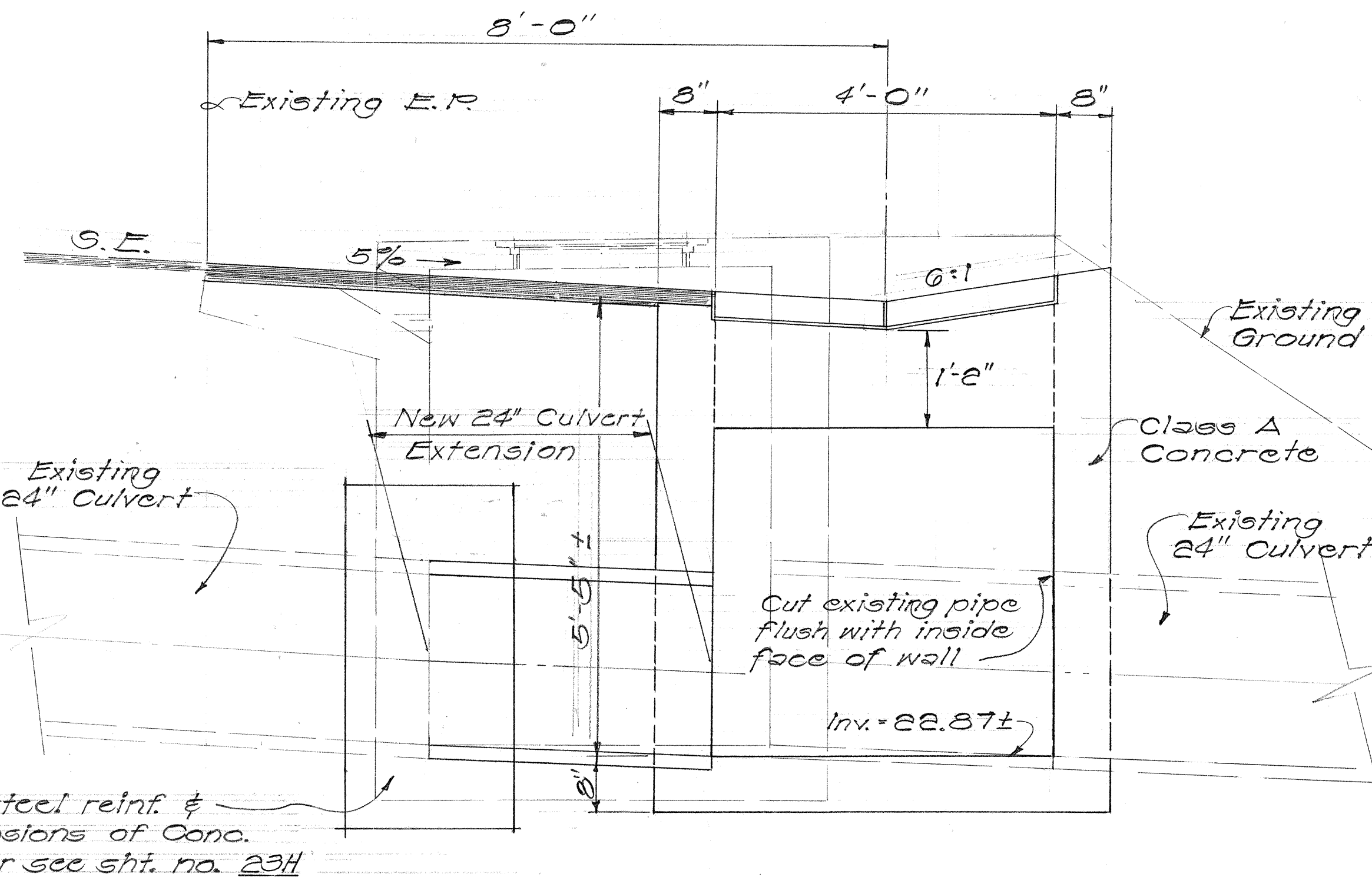


PLAN
Scale: 1/2" = 1'-0"



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

GRATED INLET @ STA. 24+37 ± W.B.



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

GRATED INLET @ STA. 10+25 ± E.B.

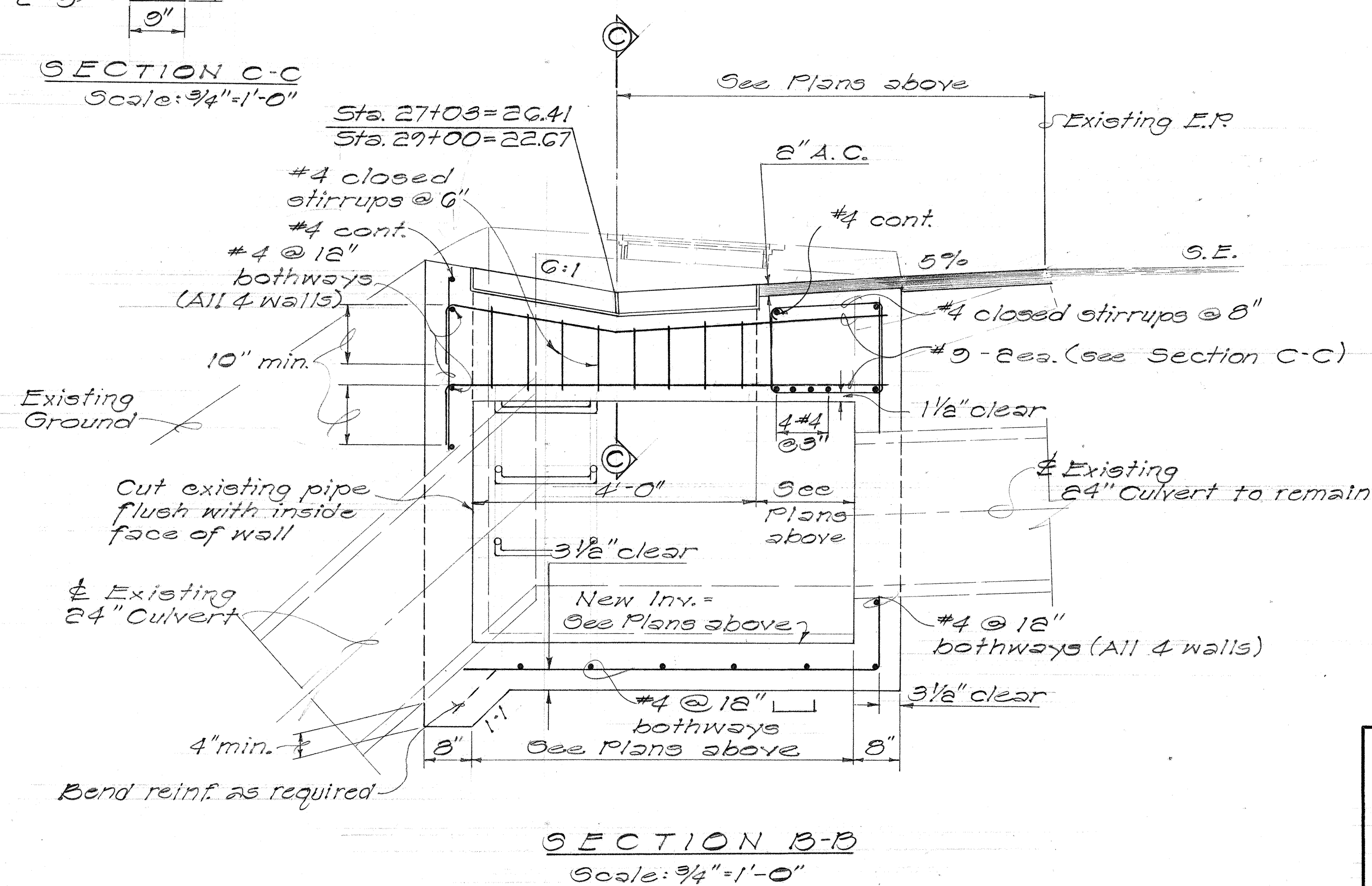
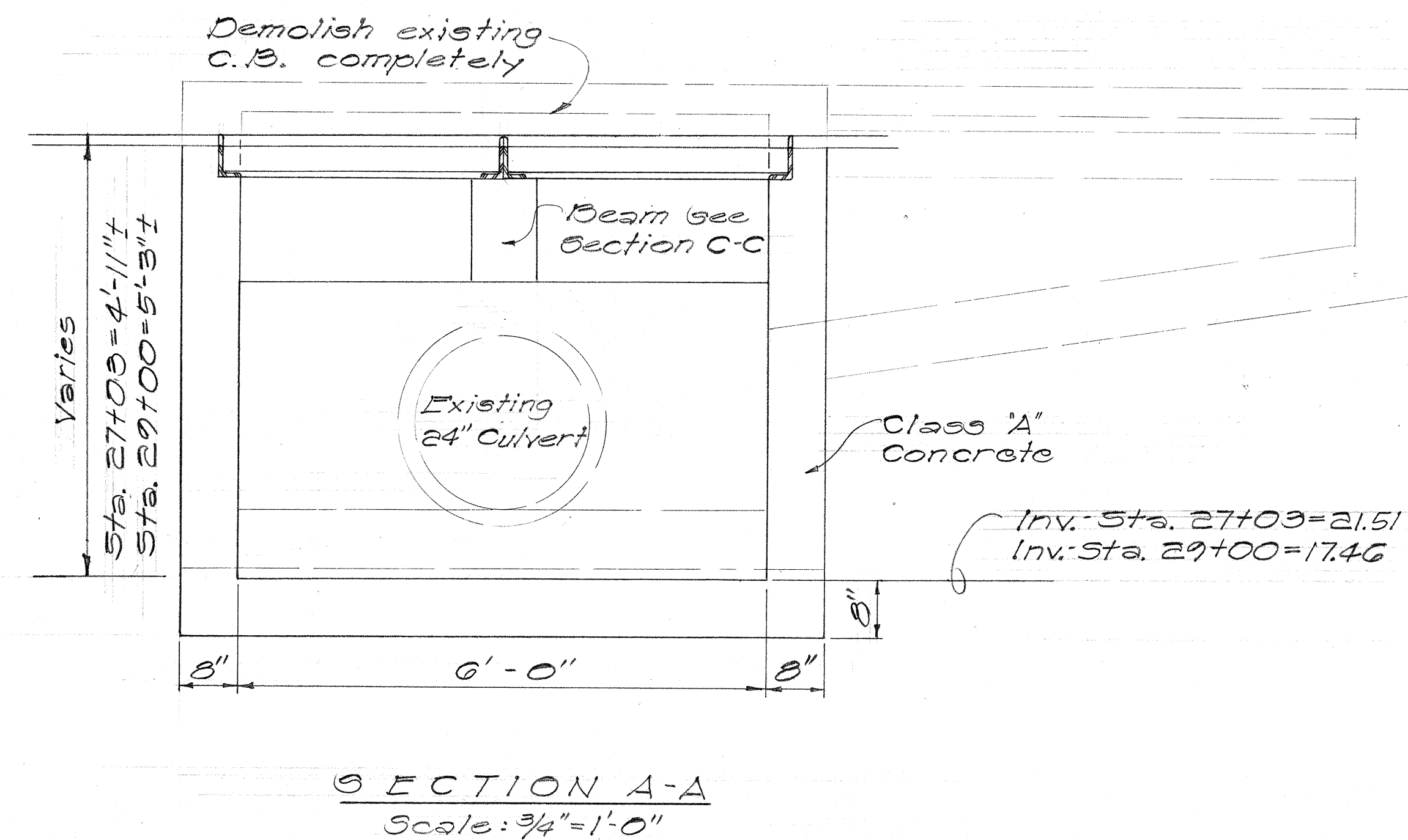
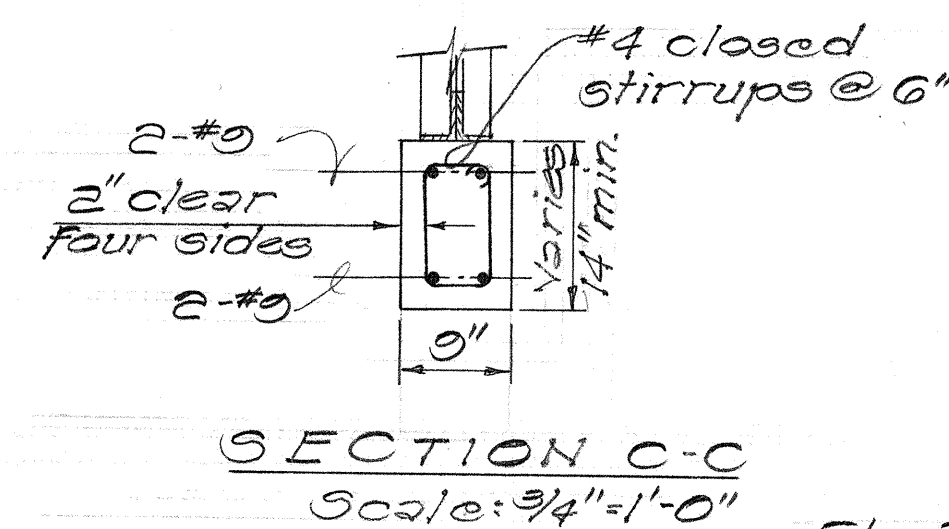
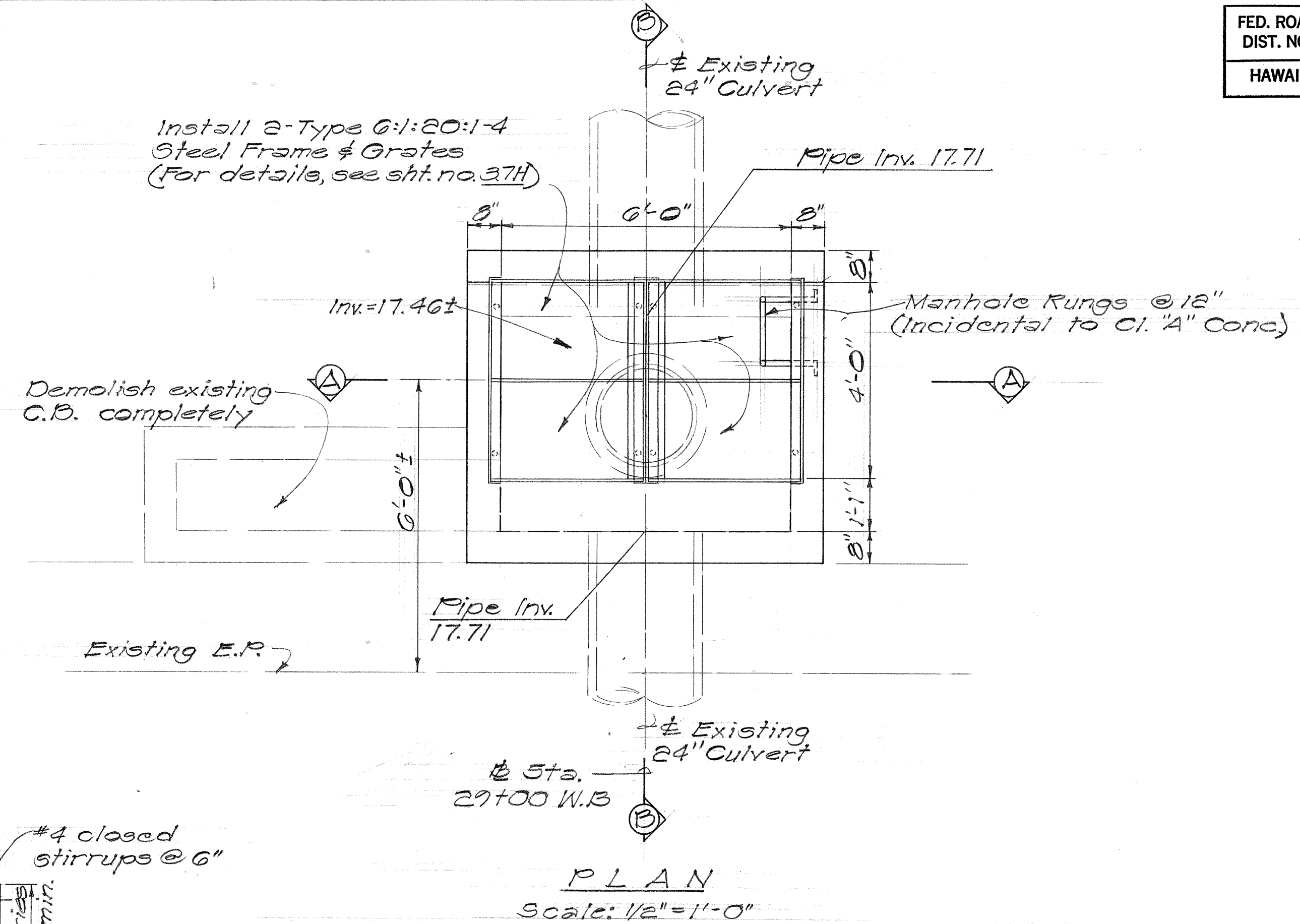
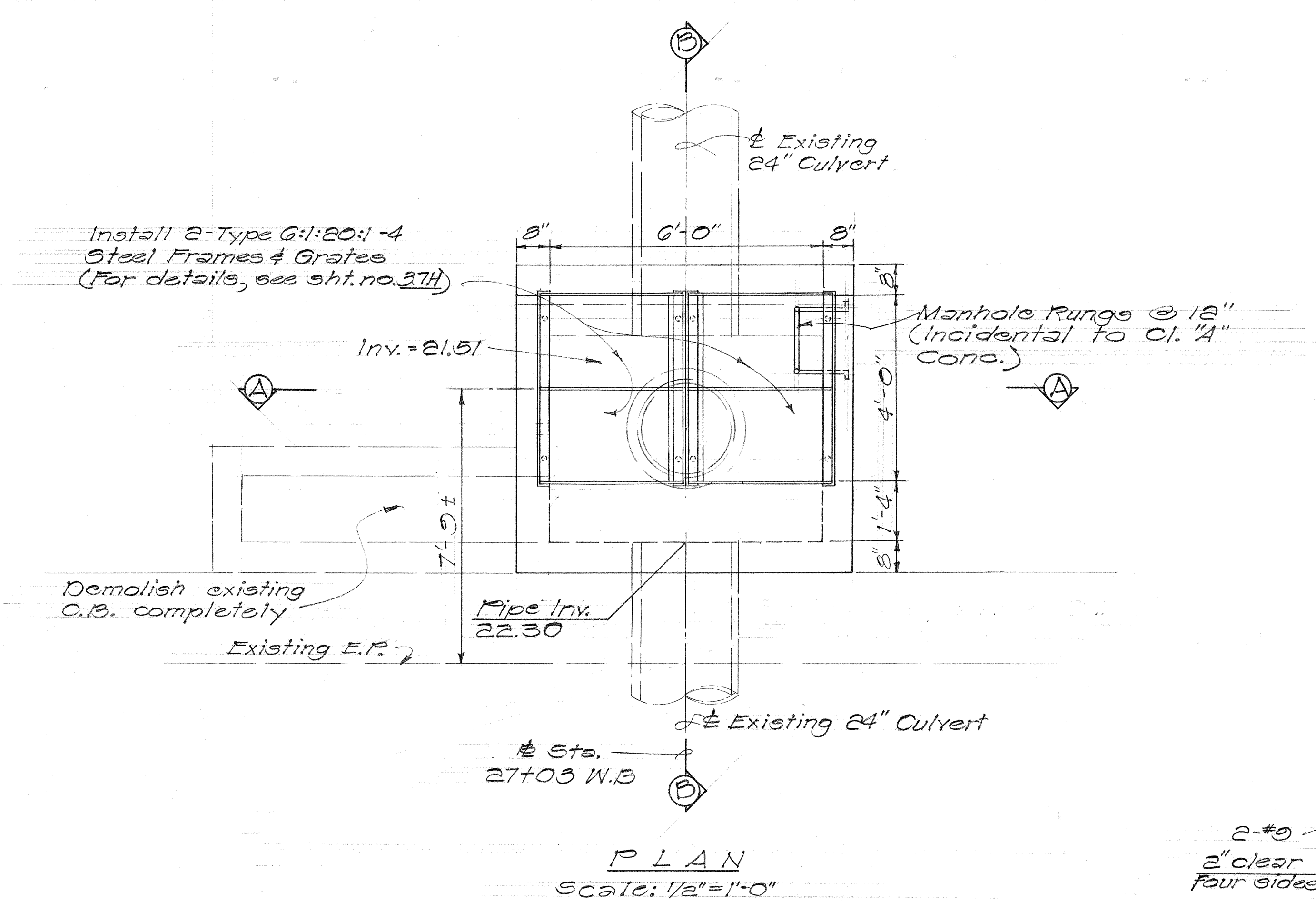
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60):23

Scale: As Shown Date: Aug. 1976

SHEET NO. 314 OF 414 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	TH-1(60)-23	1976	94	181



GRATED INLET @ STA. 27+03 ± W.B. AND 27+00 W.B.

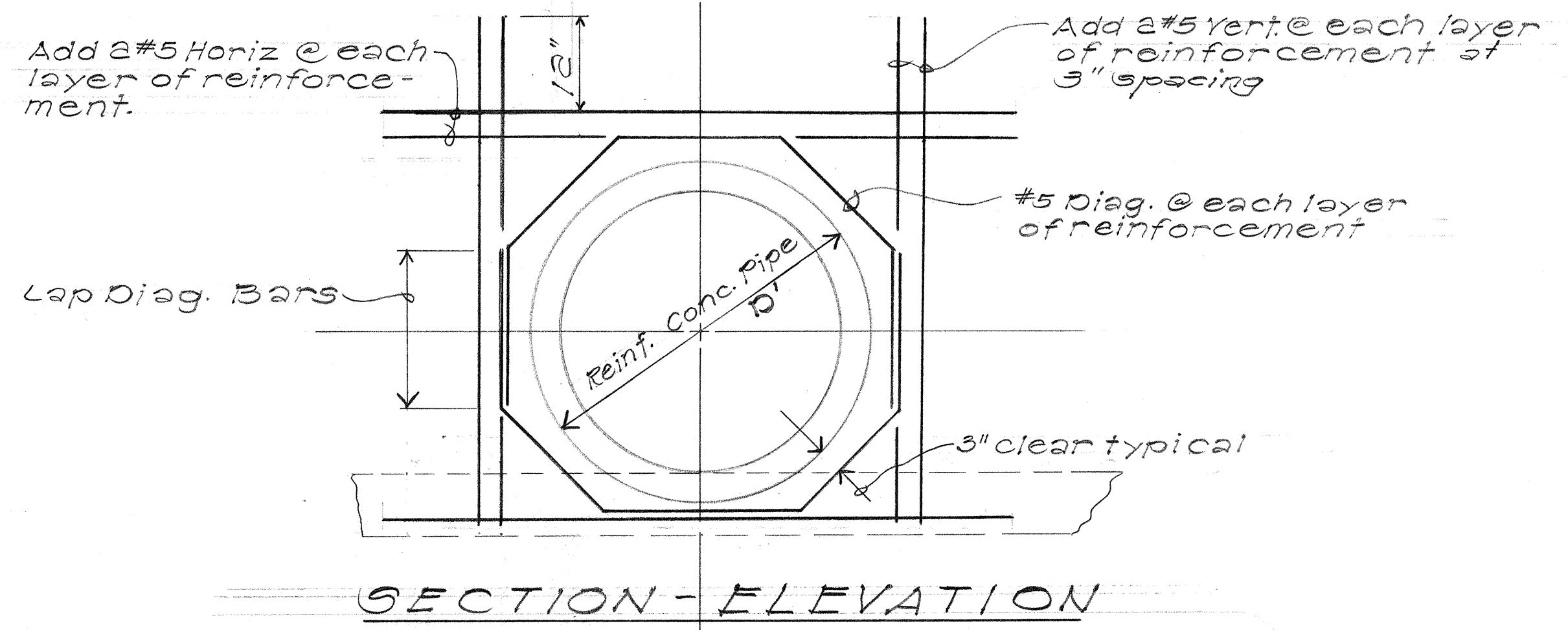
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-HI-1(60):23

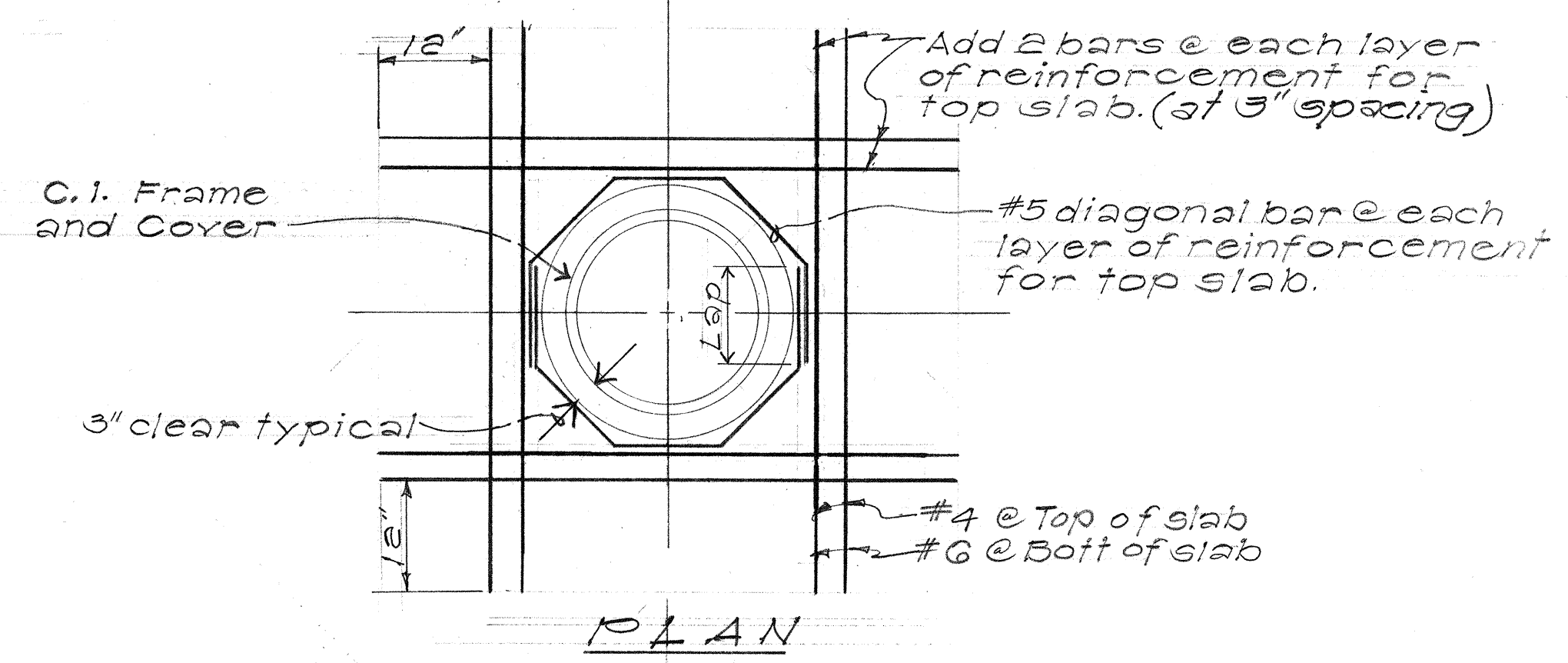
Scale: As Shown Date: Aug. 1976

SHEET No. 327 OF 414 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1-1(60):23	1976	25	131

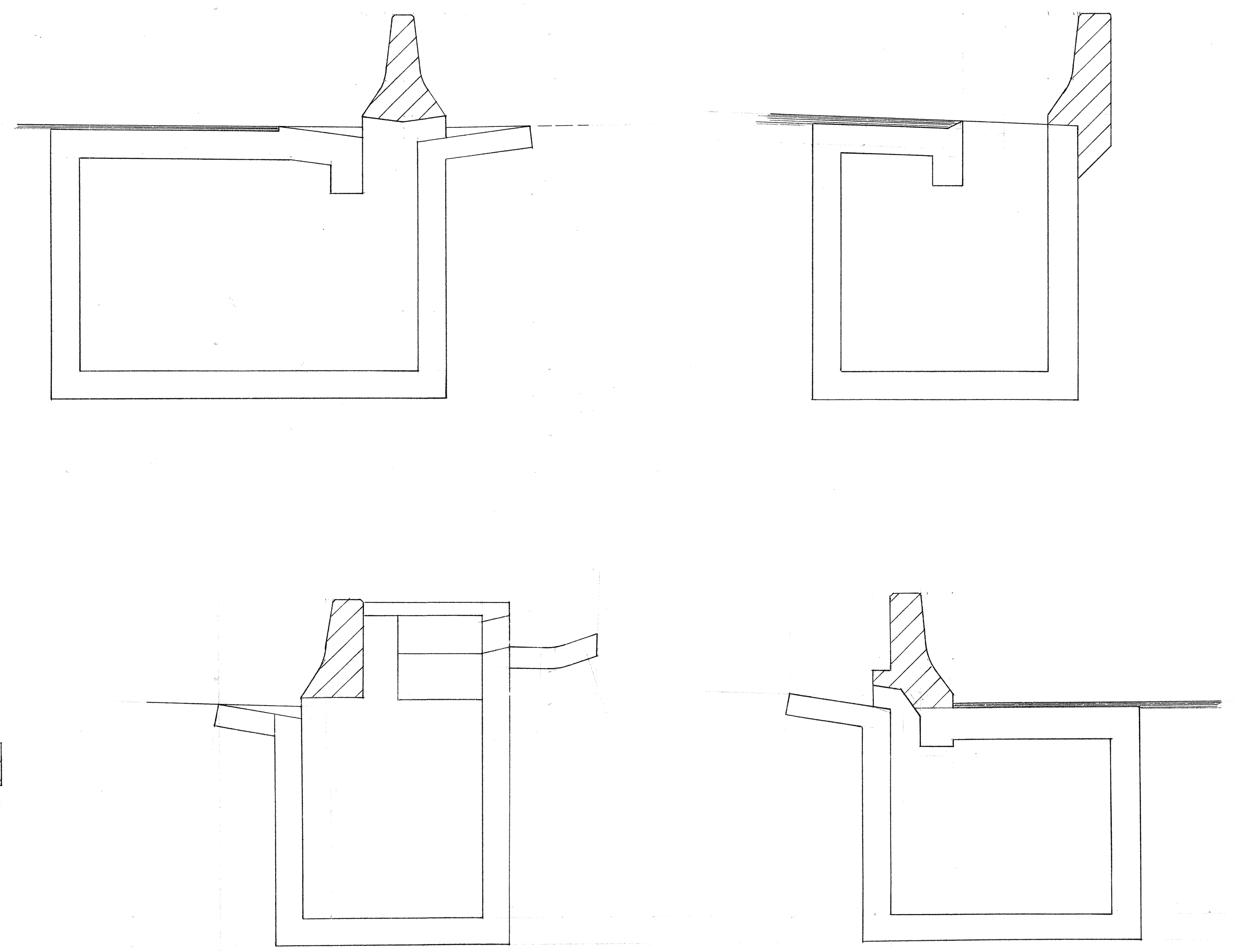


SECTION-ELEVATION
TYPICAL REINF. AROUND REINF. CONC. PIPE
Scale: 3/4" = 1'-0"



PLAN
TYPICAL REINF. AROUND C.I. FRAME & COVER
Scale: 3/4" = 1'-0"

Note: Except where added reinforcing steel bar around culverts and manhole cover opening in the walls and slabs are indicated on the plans; reinforcing steel bars shall be added around culverts and manhole cover openings in the walls and slab of all other GDMH, C.Bs and Grated Inlets as shown above.



Payment limits for concrete barrier.

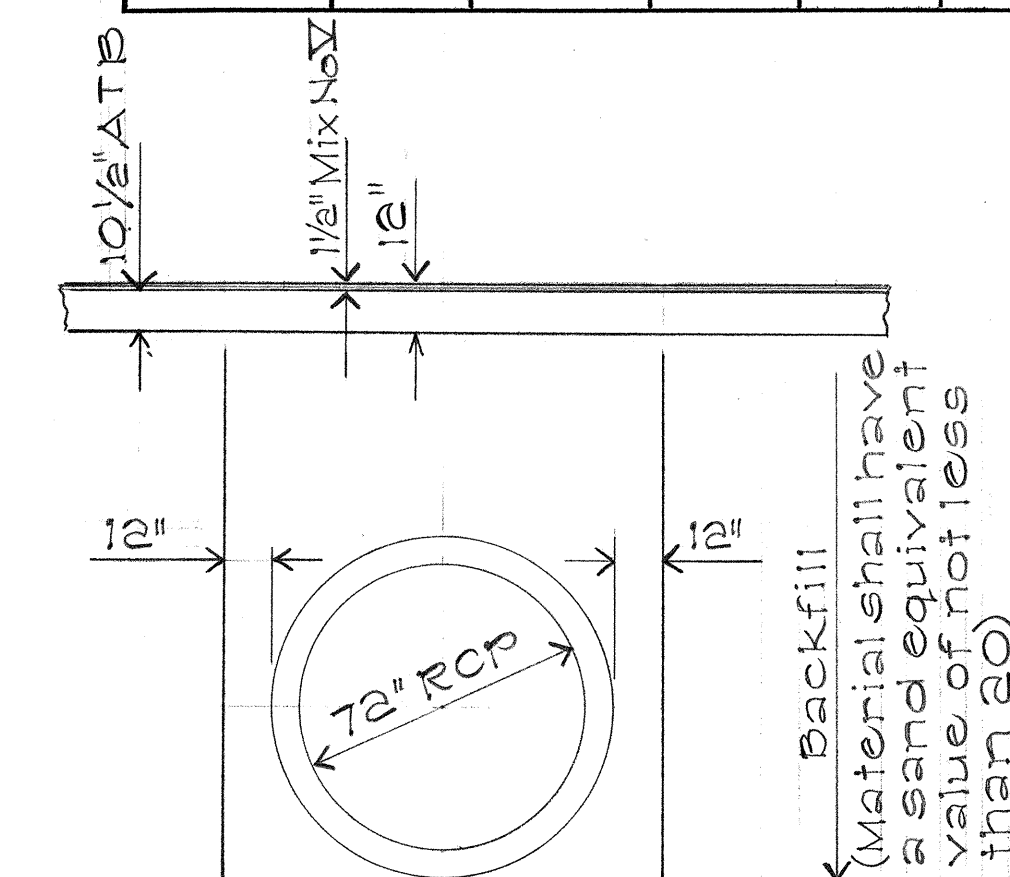
TYPICAL PAYMENT LIMITS FOR CONCRETE BARRIERS
OVER CATCH BASINS AND GRATED INLETS

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-H-1-1(60):23
Scale: As Shown Date: Aug., 1976
SHEET No. 33H OF 41H SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1(60)23	1976	26	181



TYPICAL BACKFILL FOR 72" RCP
Scale: 1/4" = 1'-0"

NOTES

- Existing drainage system will be functional at all times during construction. Contractor is to furnish materials, equipment, labor, tools and incidentals necessary to accomplish maintenance of flow, the cost of which shall be incidental to the various contract items.
- The cost of materials, equipment, tools, labor and incidentals necessary to plug existing culvert pipes shall be considered incidental to the various contract items.
- For details and profile of box culvert, see sheet no. 35H and 36H.
- Locations of existing utilities shown on plans are approximate. Contractor shall verify the location of all existing utilities in the field. Any existing utilities damaged during construction shall be repaired or replaced by the contractor at his expense.
- Median concrete barrier shall remain and any damages to the concrete barrier during construction shall be repaired by the contractor at his expense.

APPROVED:

Kay Hayashida

7/19/76

DIRECTOR & CHIEF ENGINEER,
DEPT. OF PUBLIC WORKS,
CITY & COUNTY OF HONOLULU

DATE

William D. Luy
CHIEF, DIVISION OF ENGINEERING
DEPT. OF PUBLIC WORKS

7/14/76

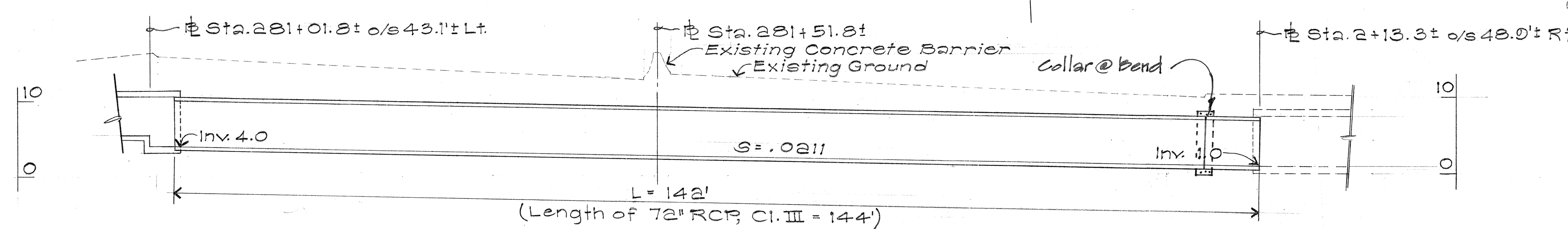
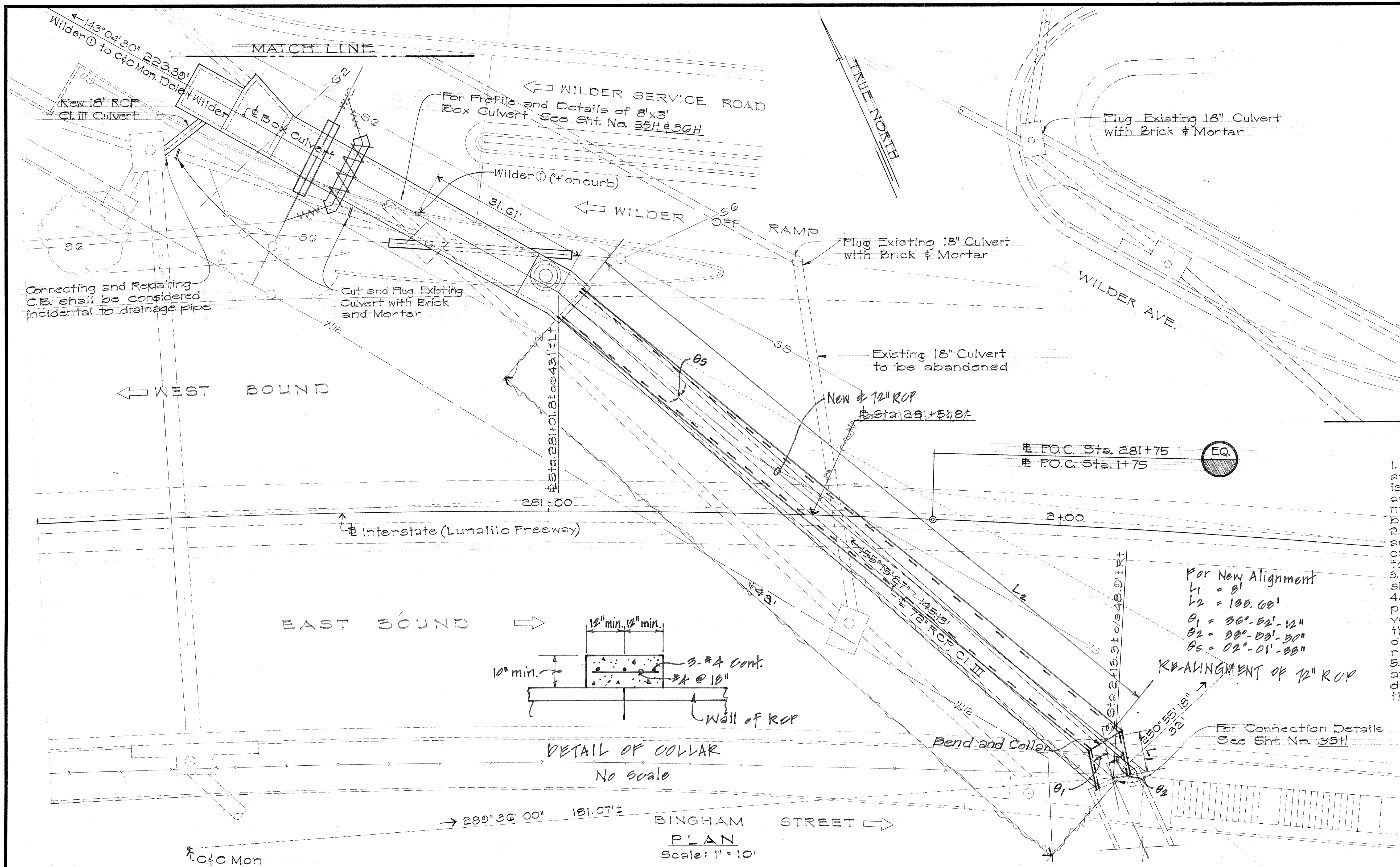
DATE

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION DRAINAGE DETAILS

F.A. 1. Proj. No. I-H-1(60)23

Scale: As Shown Date: Aug. 1976

SHEET No. 34H OF 41H SHEETS

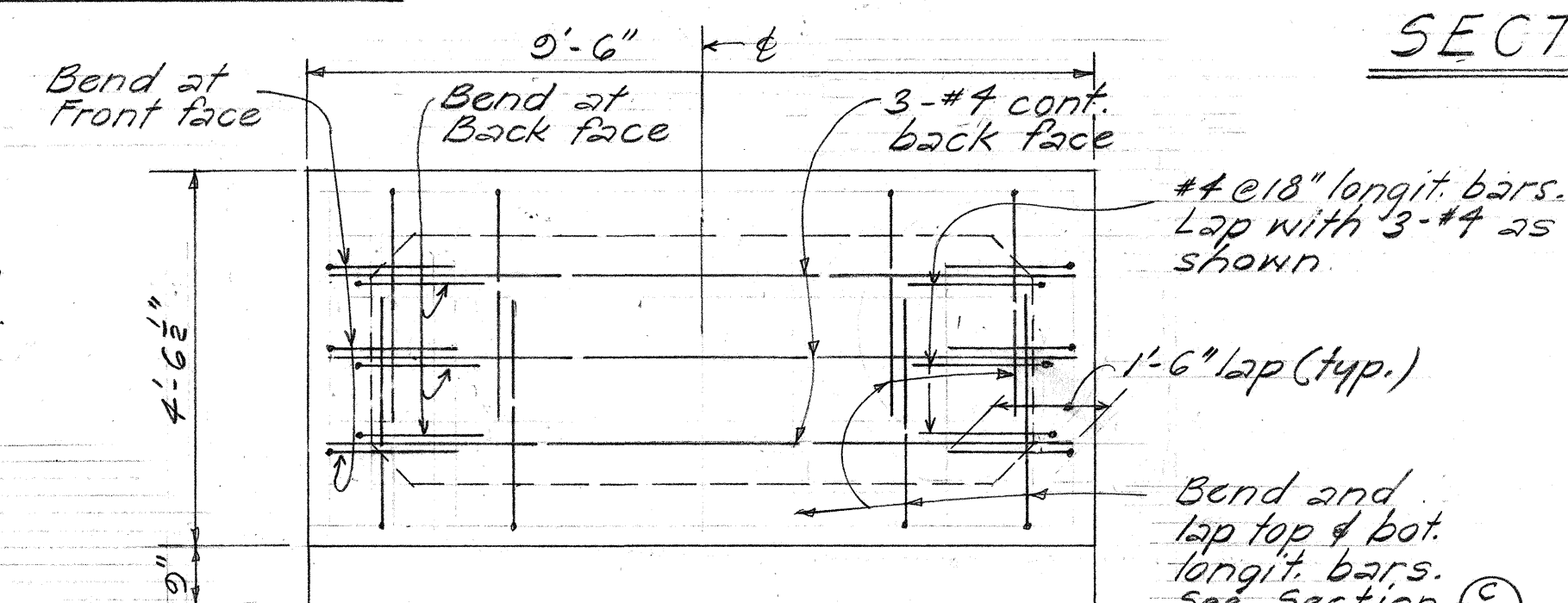
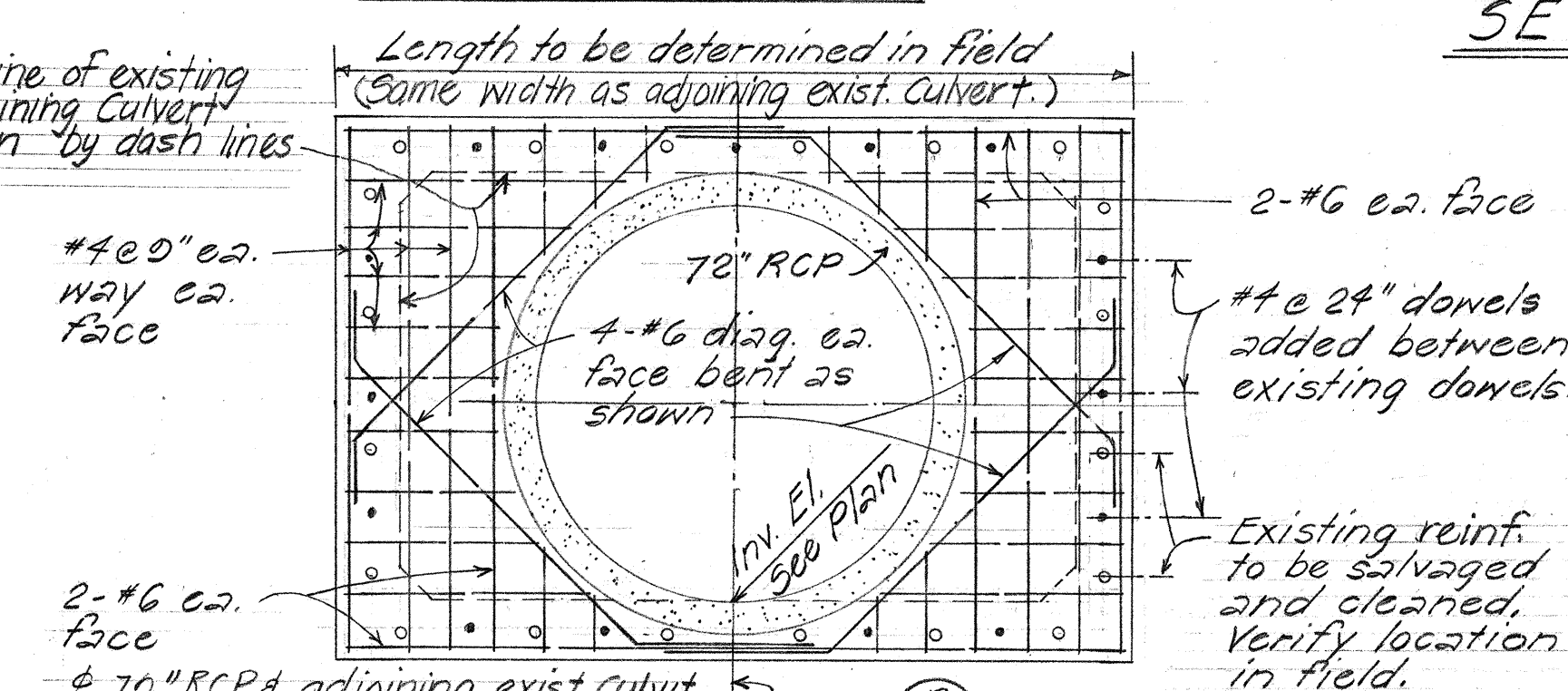
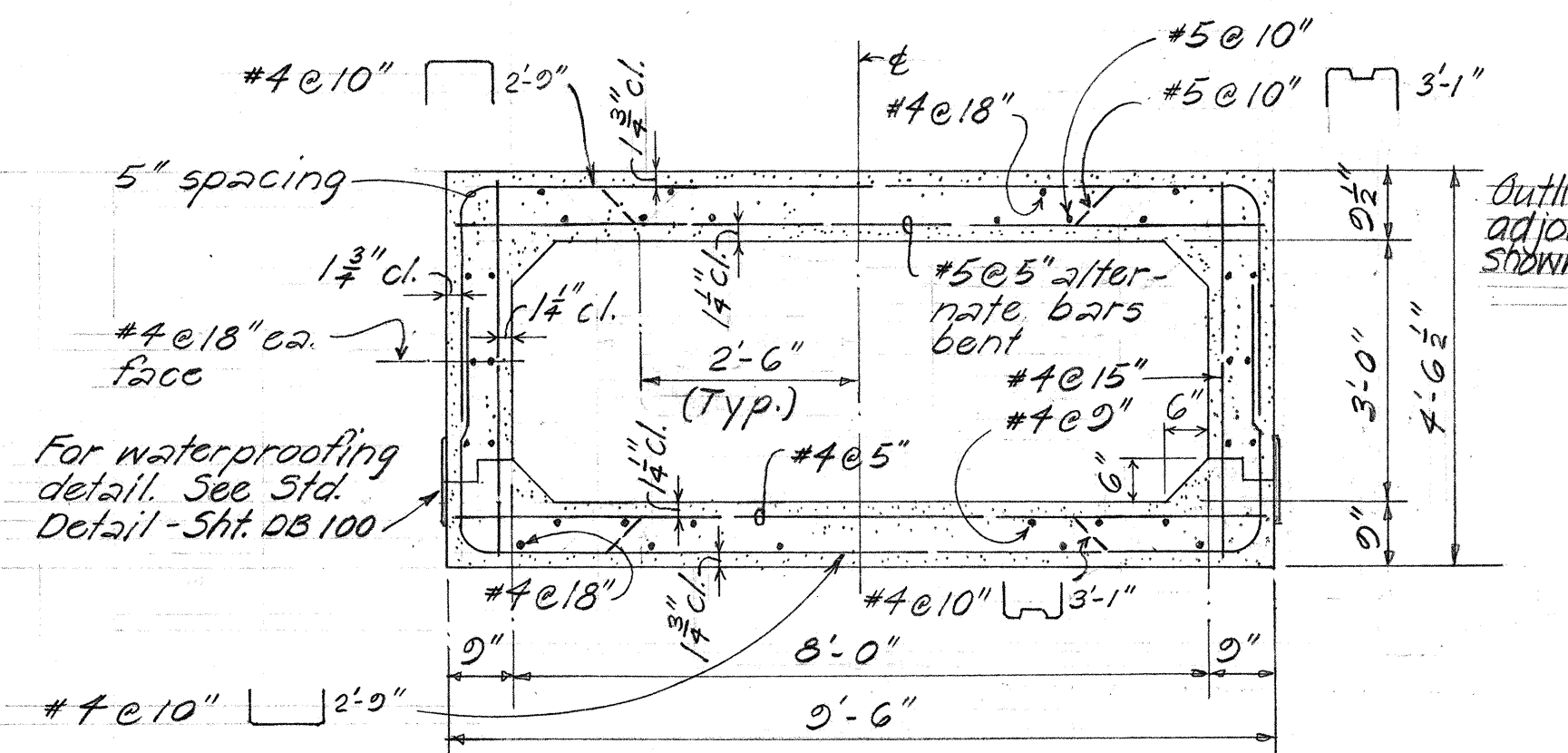
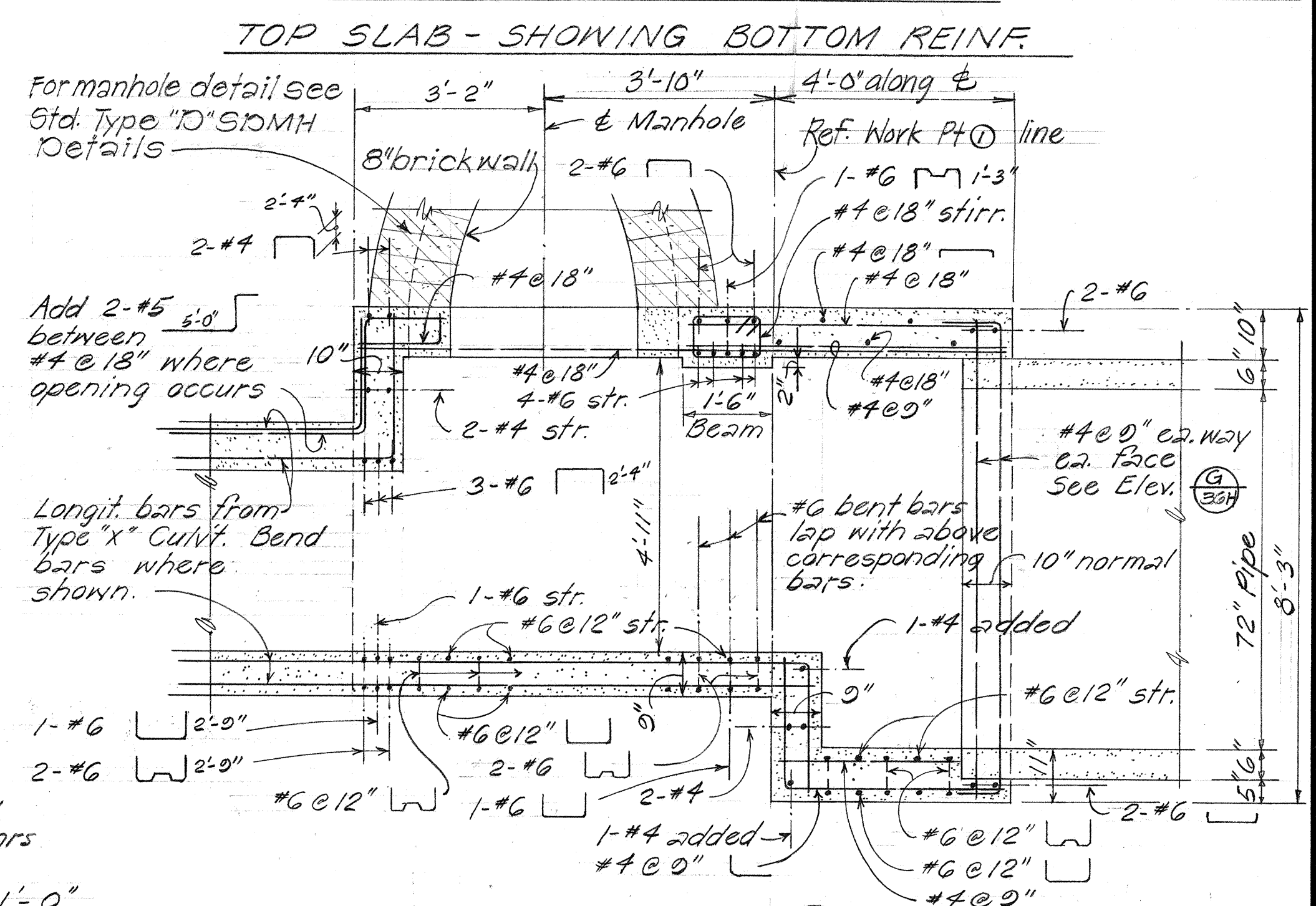
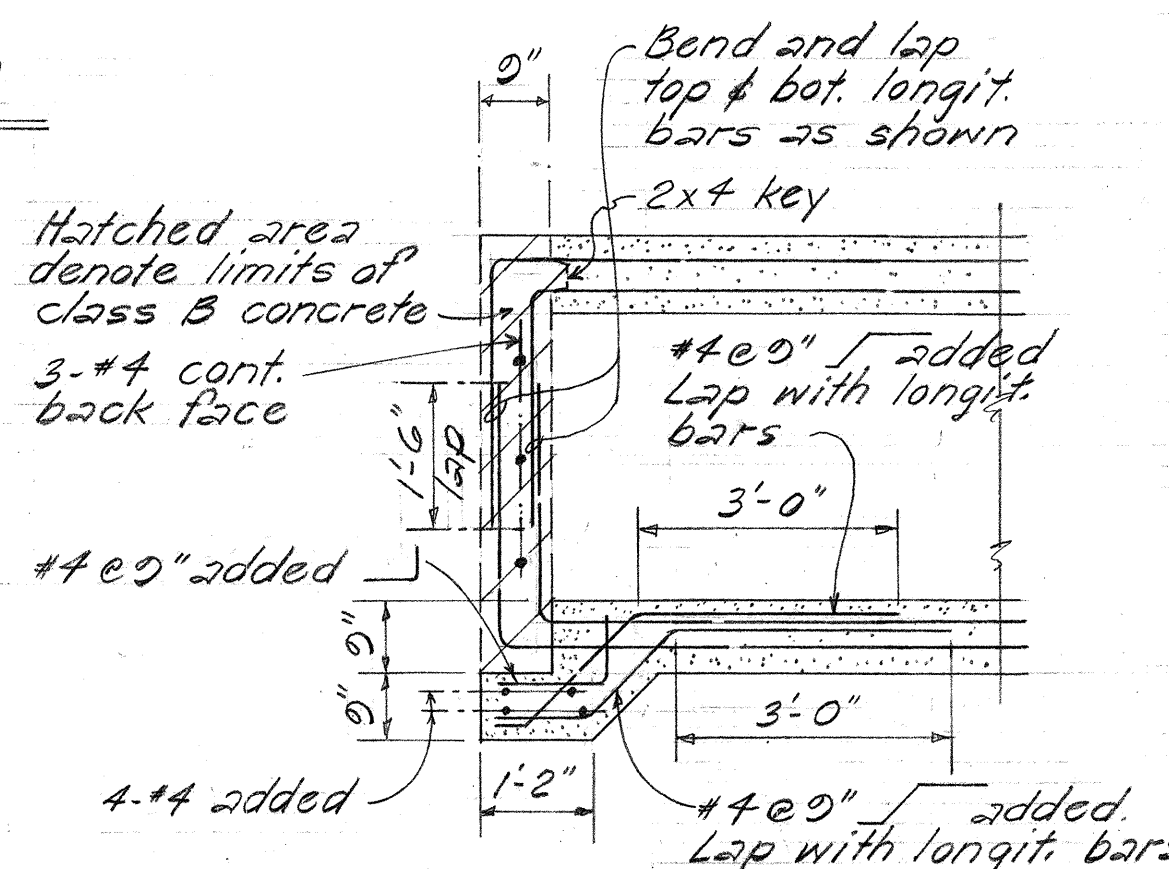
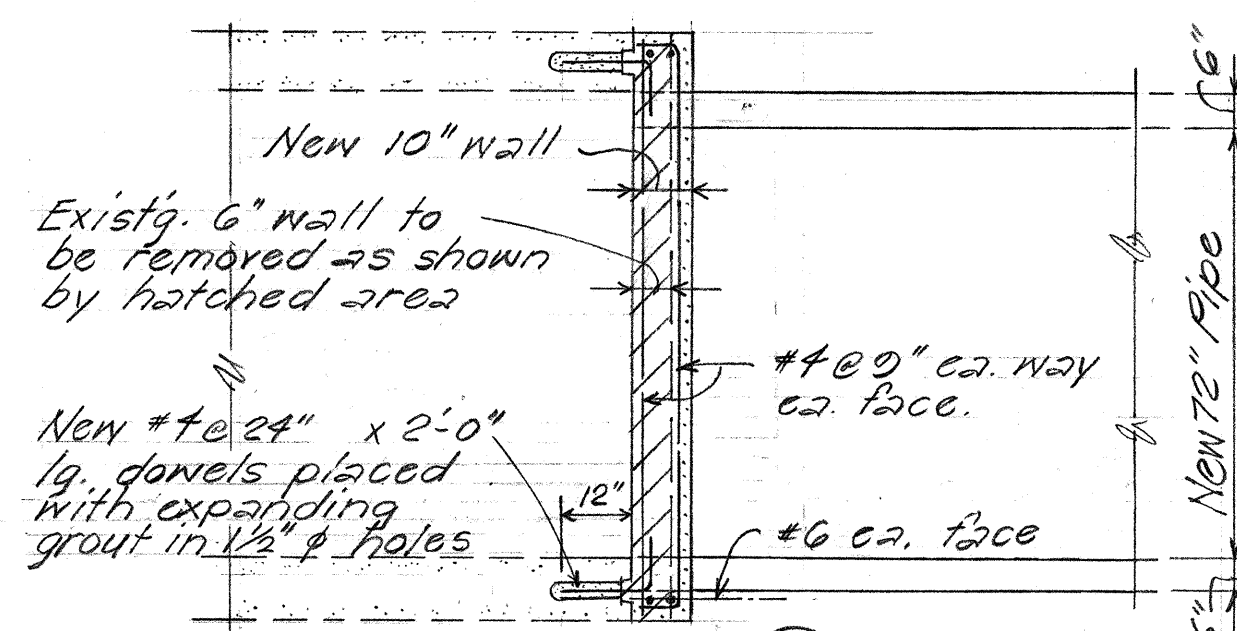
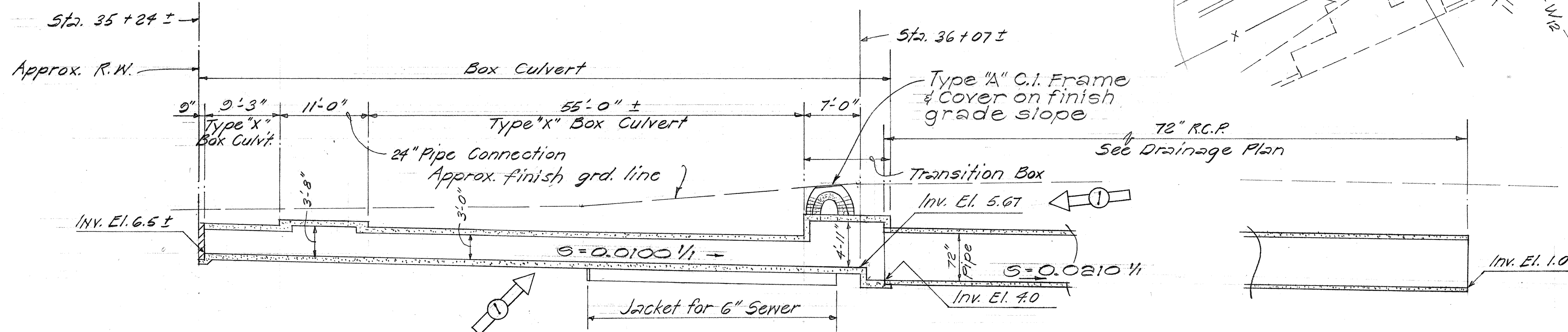
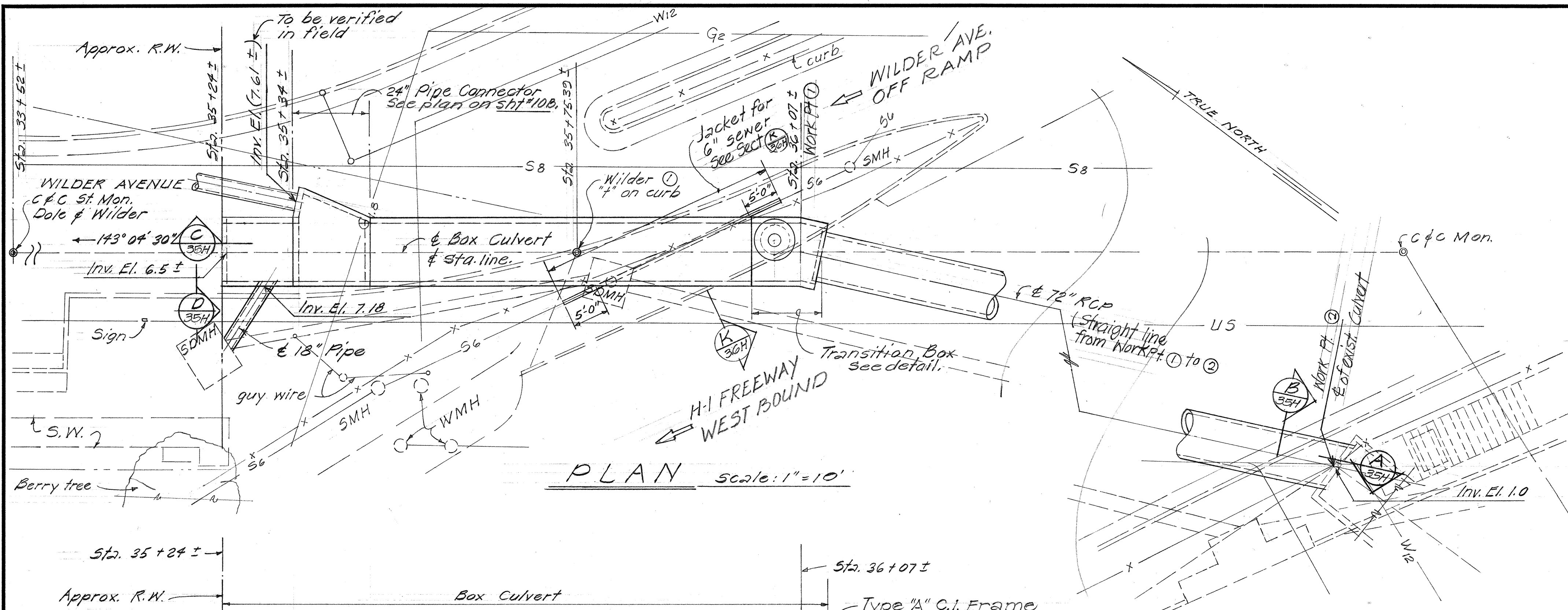


PROFILE
Scale: 1" = 10'

REVISION NO.	DESCRIPTION	APPROVED	DATE
1	Revised invert elevation, slope of RCP pipe and detail of concrete collar for existing sewer pipe.	<i>Kay</i>	7/19/76

ORIGINAL PLAN	DATE
DRAWN BY	
CHECKED BY	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

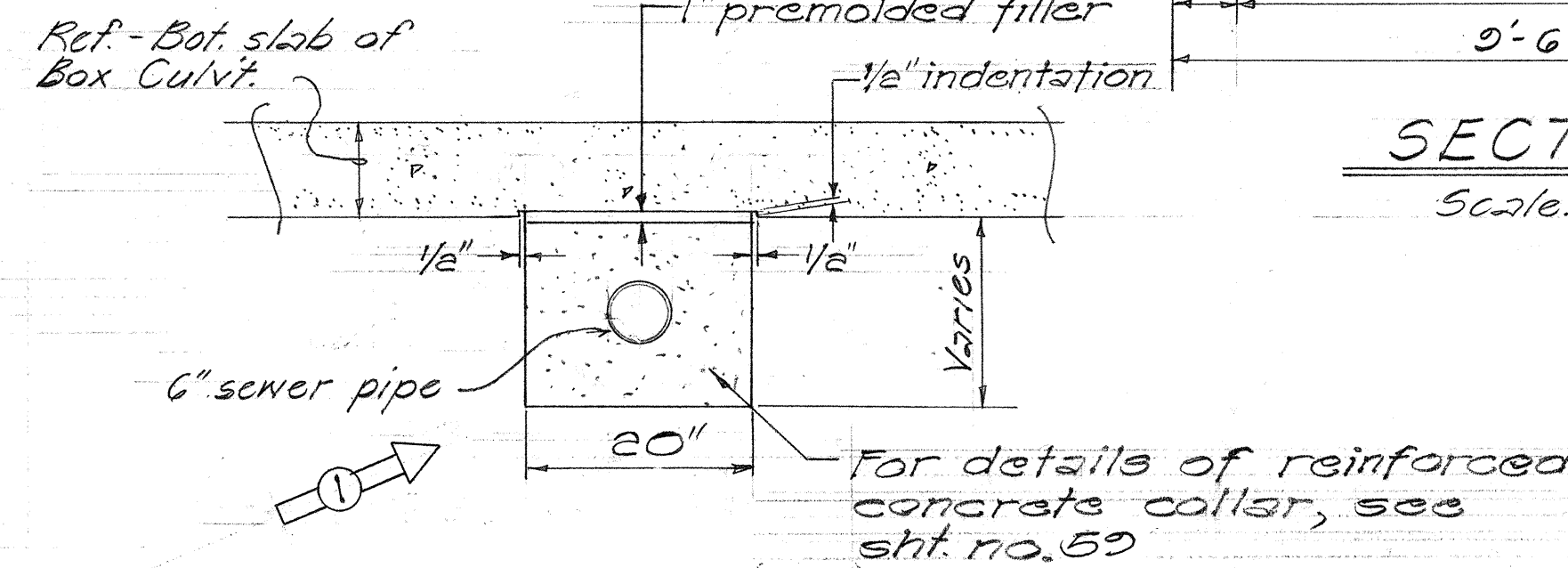
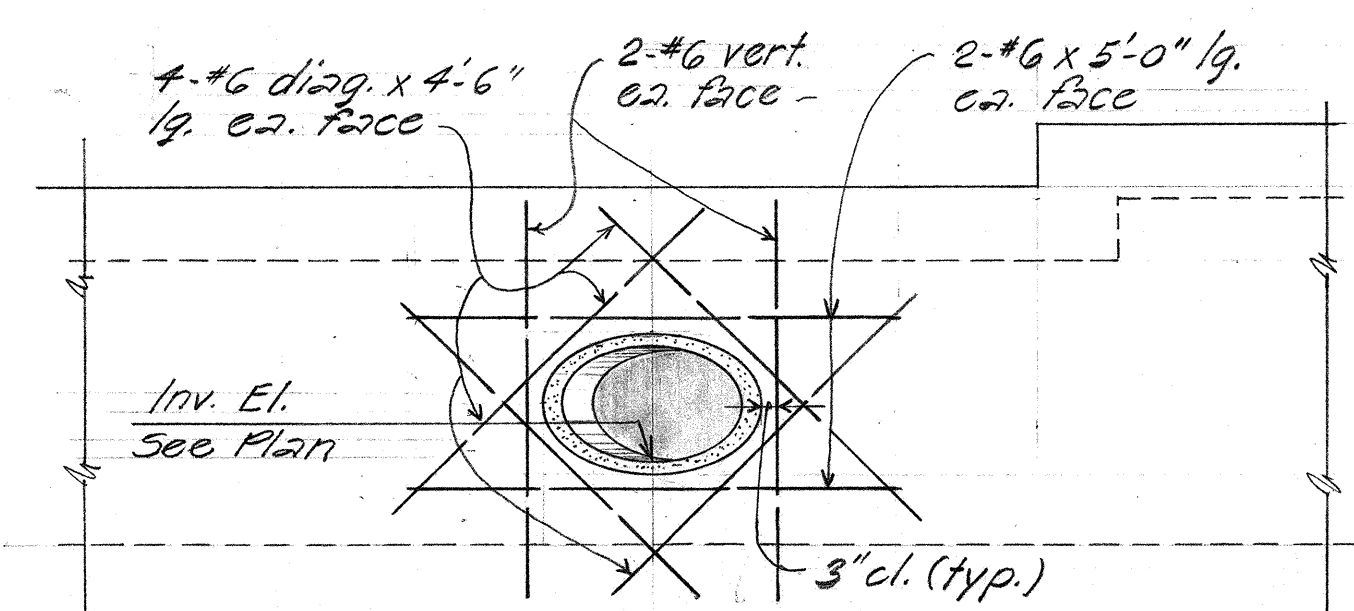
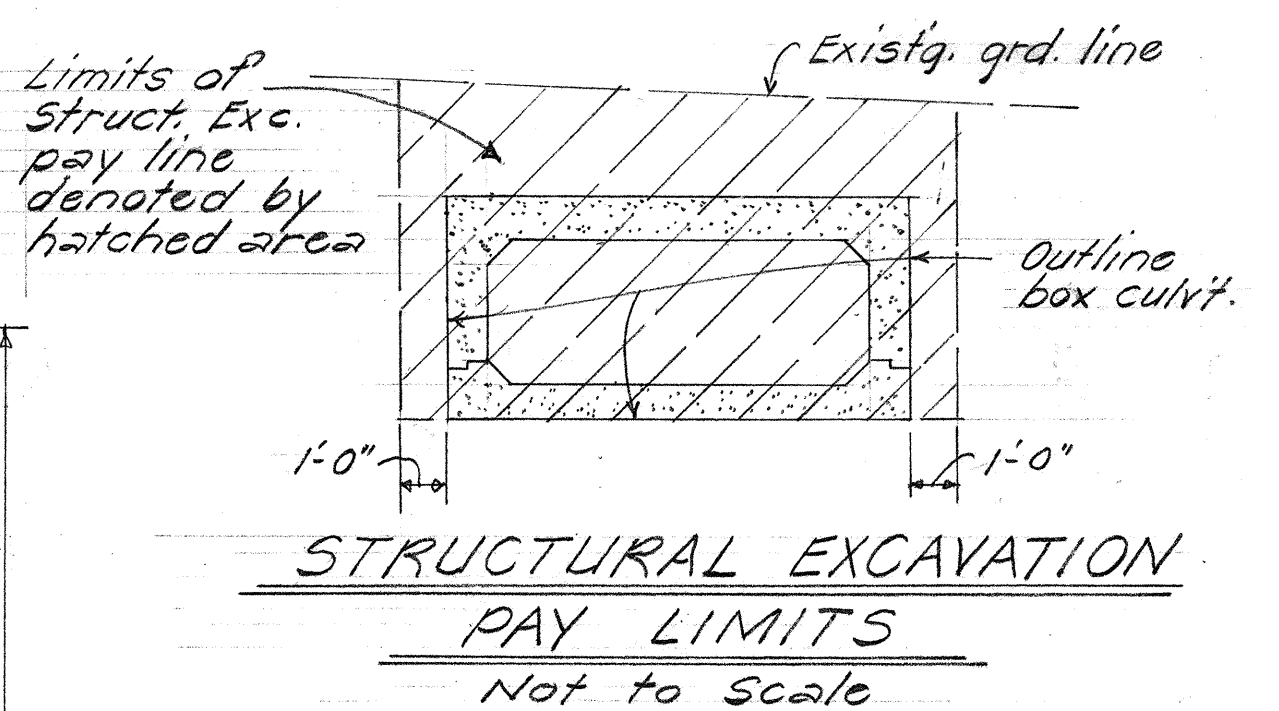
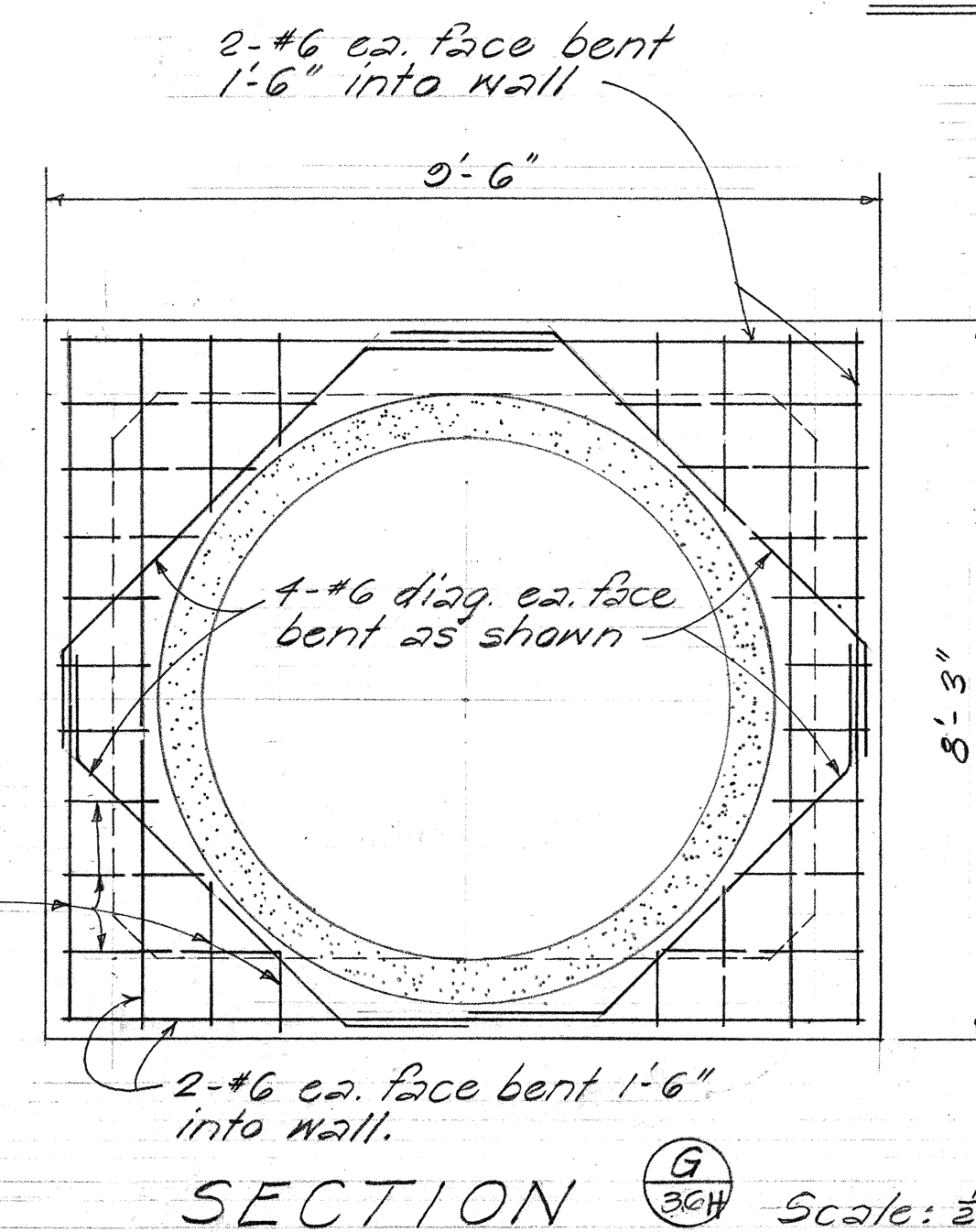
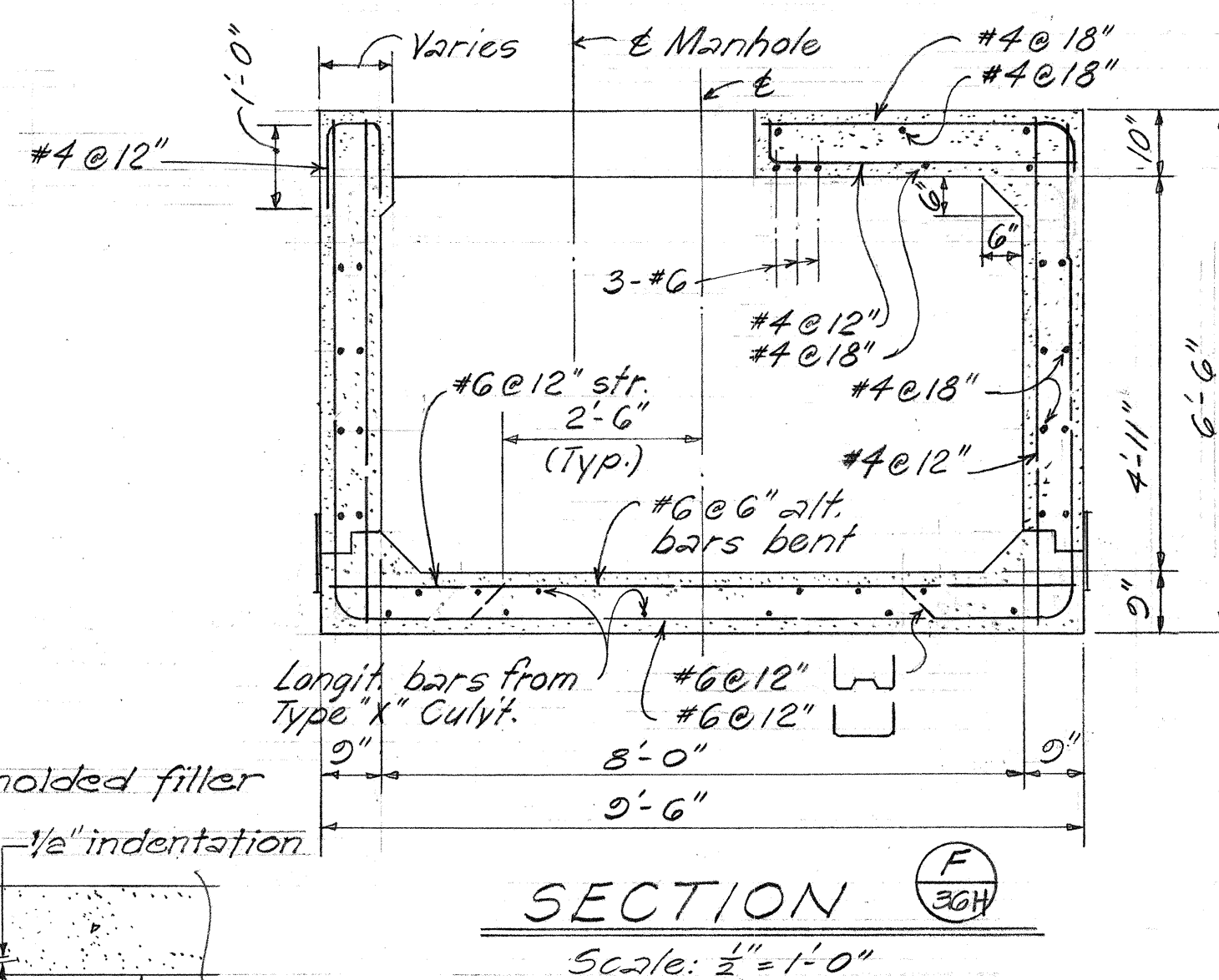
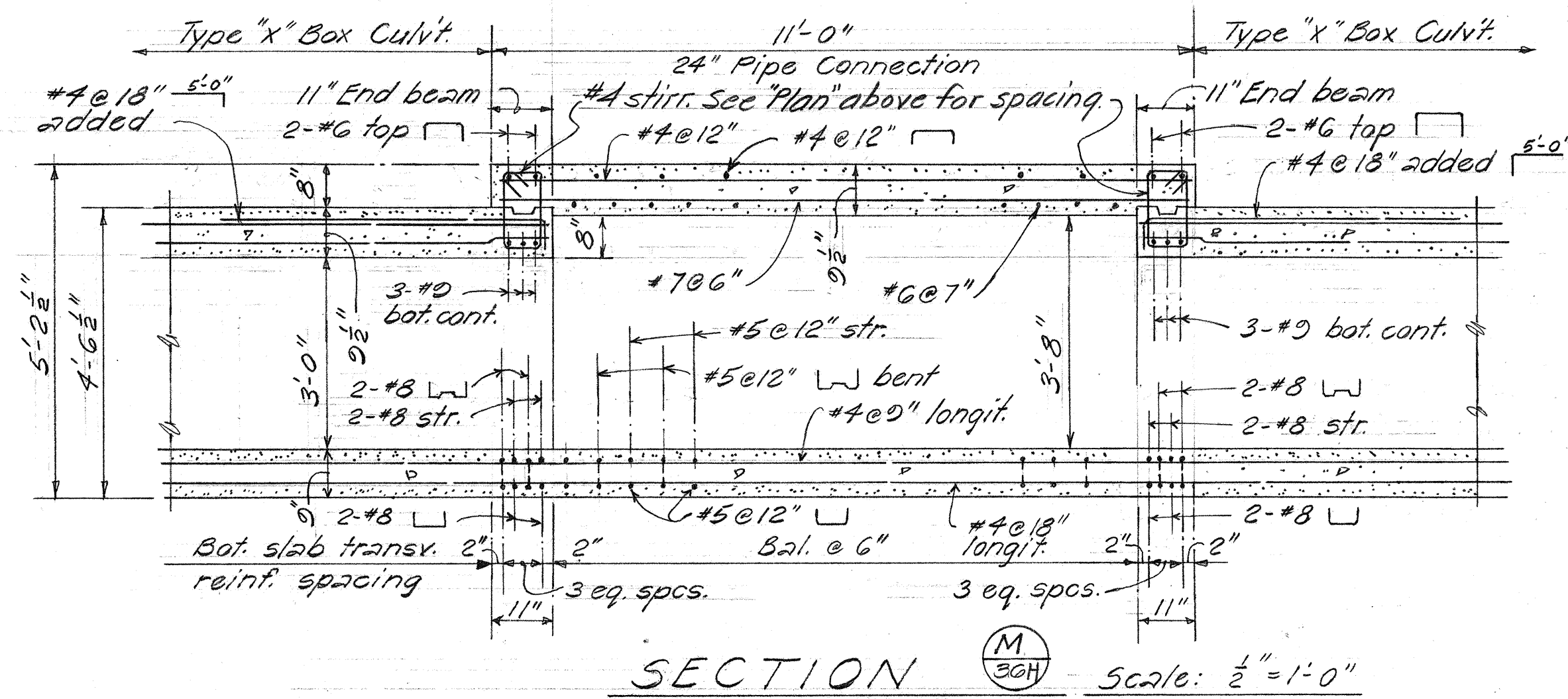
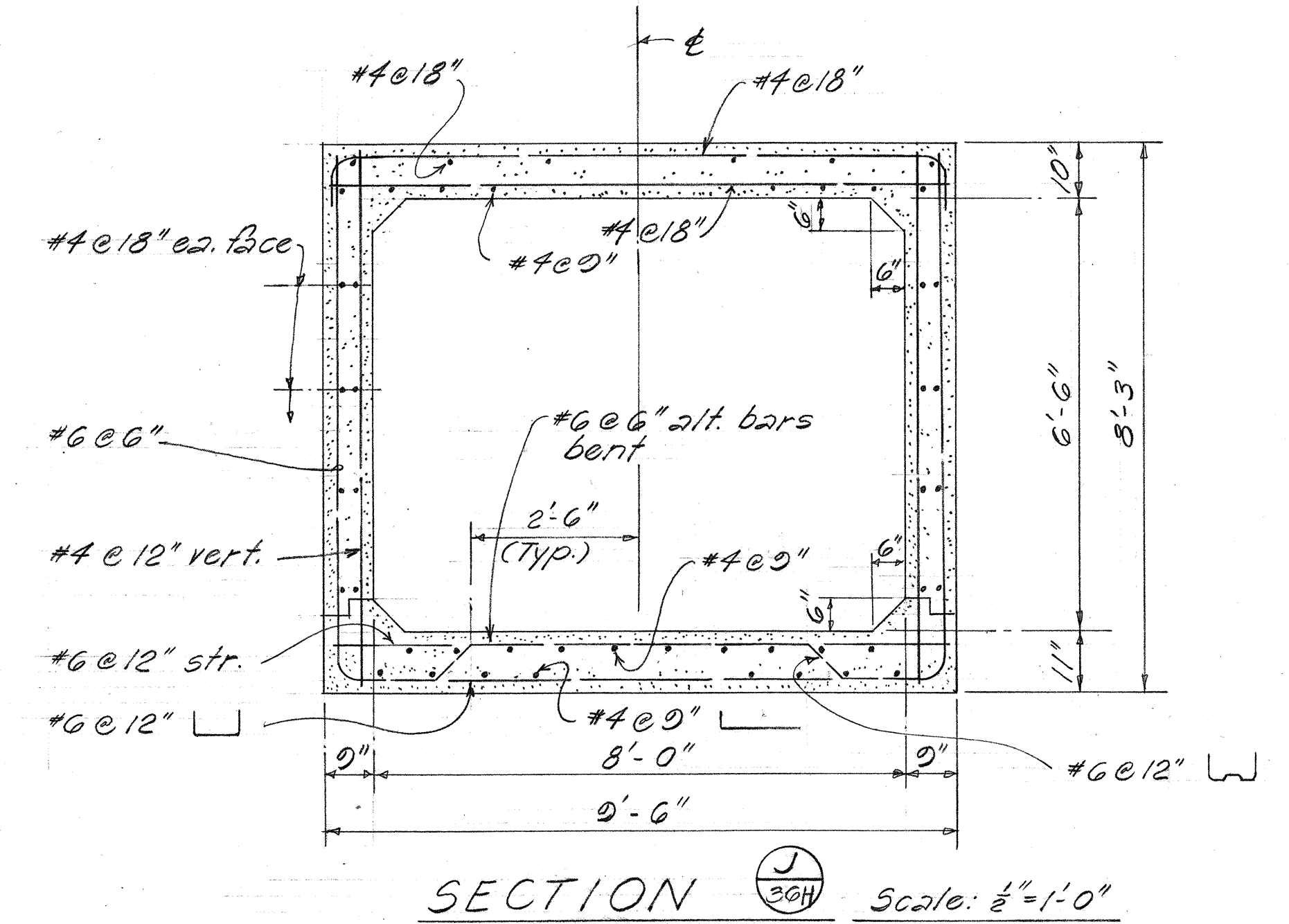
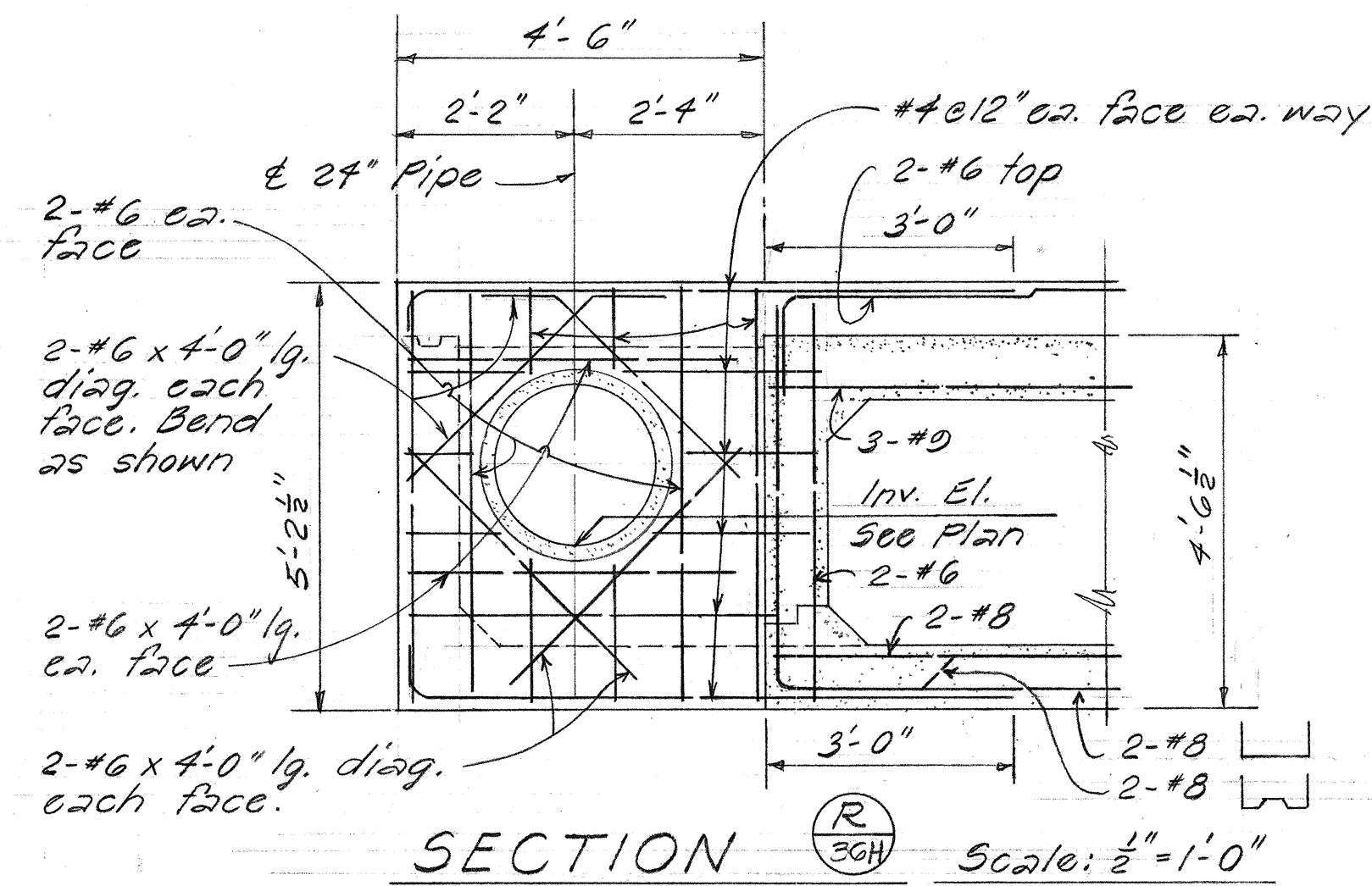
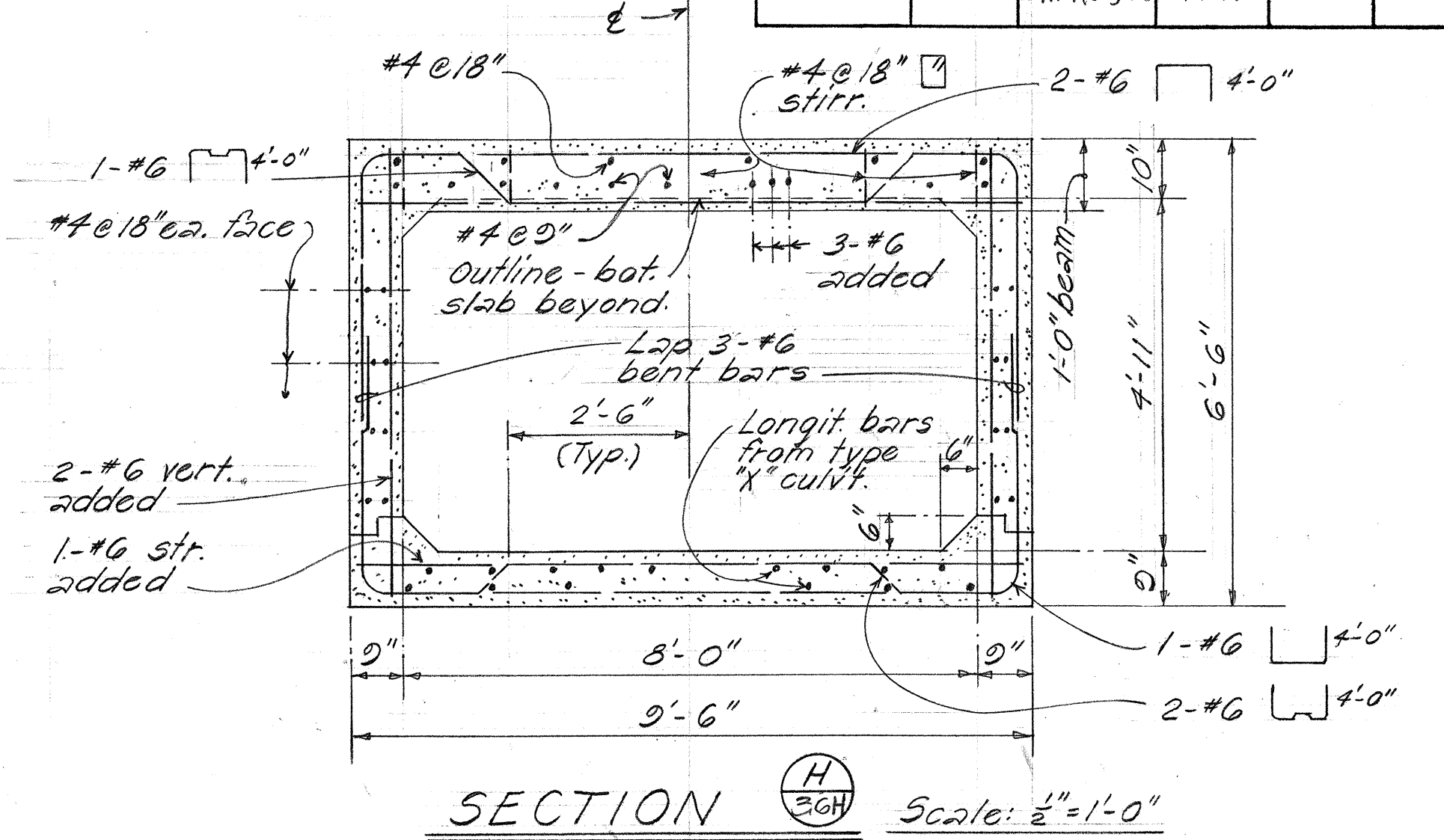
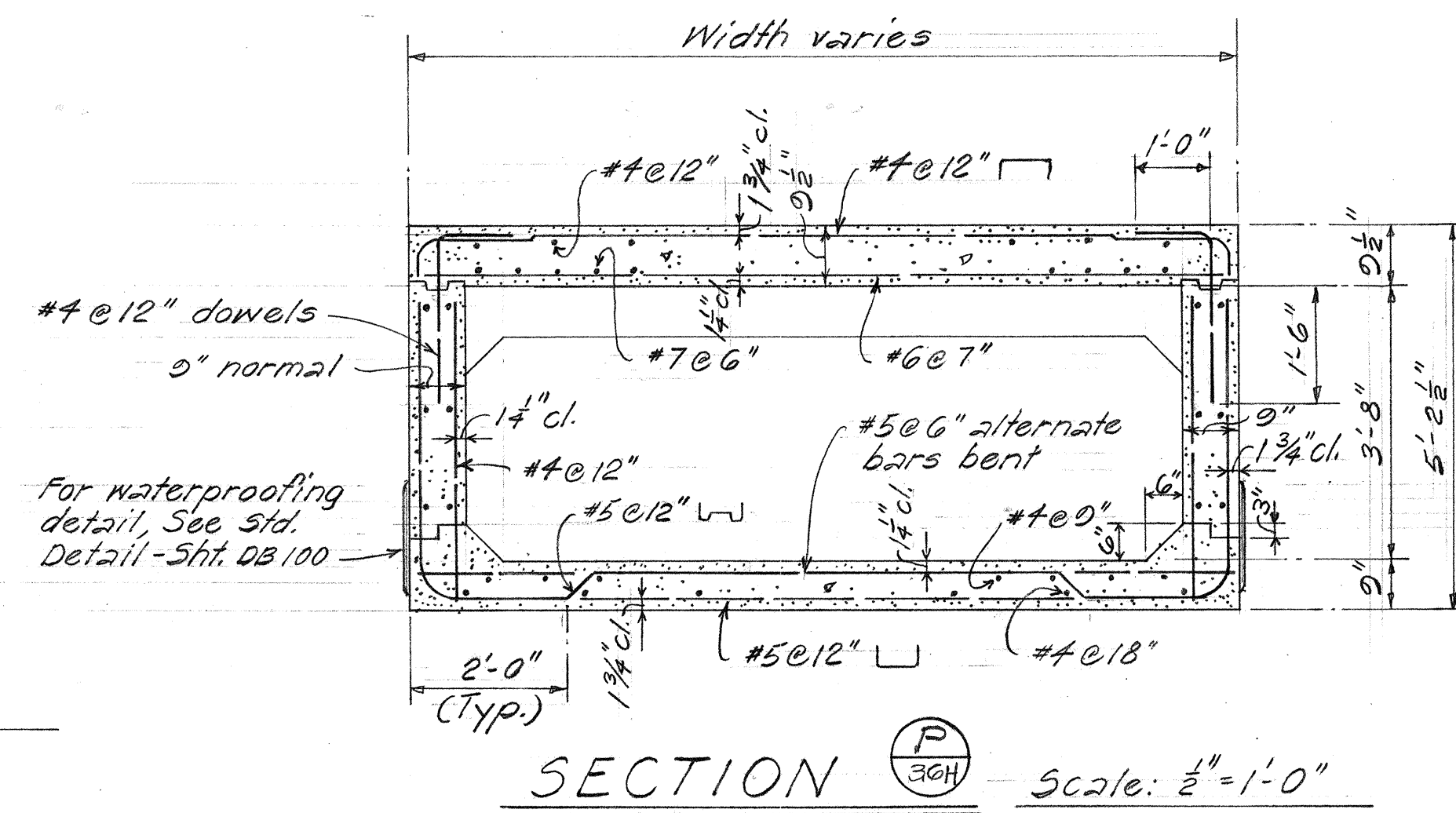
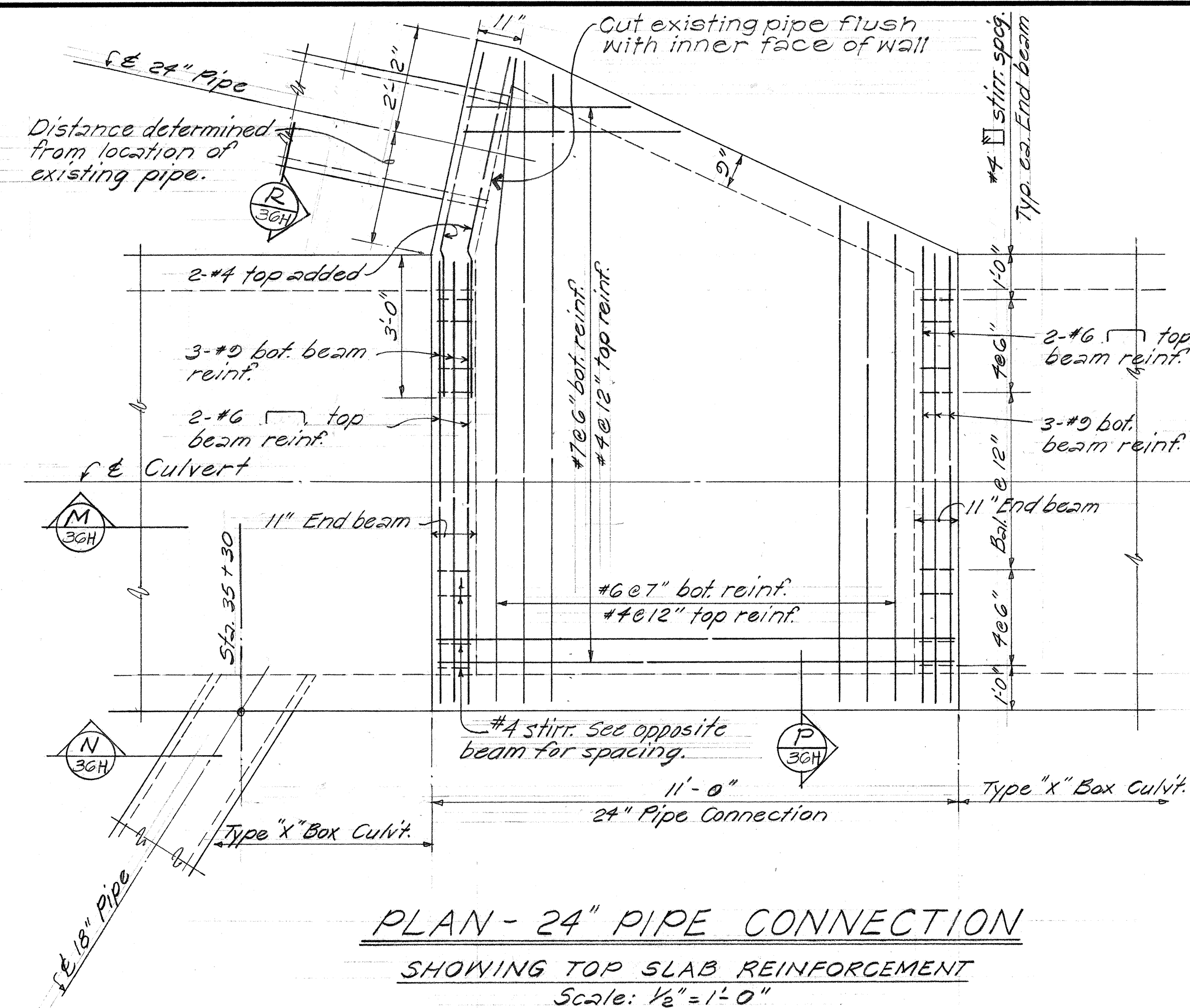
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1H-1(60):23	1976	97	181



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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
8x3 BOX CULVERT
NEAR H-1 STA. 281+00
F.A.I. Proj. No 1-HI-1(60):23
Scale: As shown Date: April 1972
SHEET No. 97 OF 181 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):23	1976	28	181



#4#12 ea. face ea. way. Bend outside bars 1'-6" into culvert wall.

NOTE: Normal reinf. not shown. Stop all normal reinf. 3" cl. from opening.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
8 X 3 BOX CULVERT
NEAR H-1 STA. 281+00

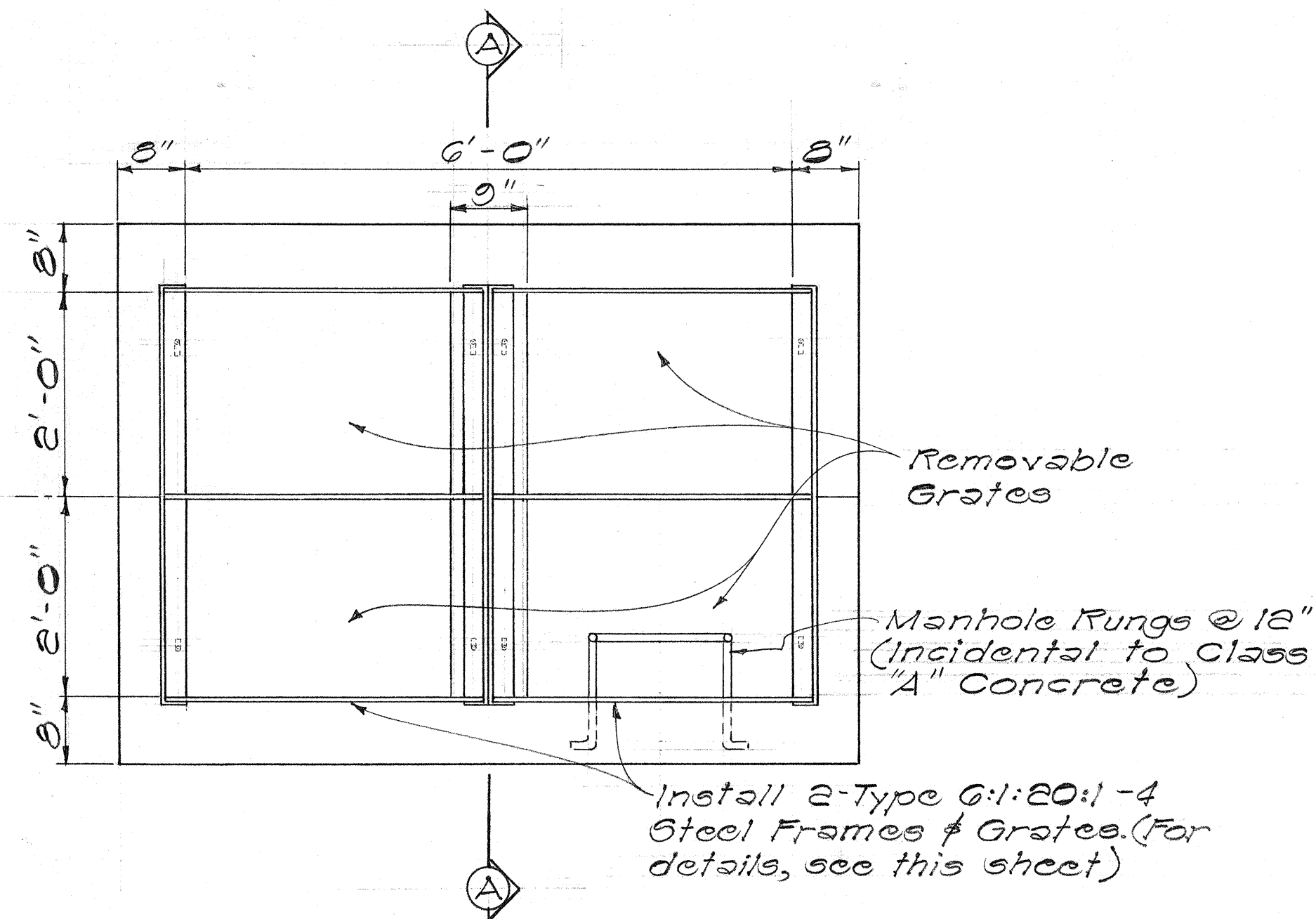
F.A.I. Proj. No. I-HI-1(60):23
Scale: As shown Date: Aug. 1976

SHEET No. 264 OF 414 SHEETS

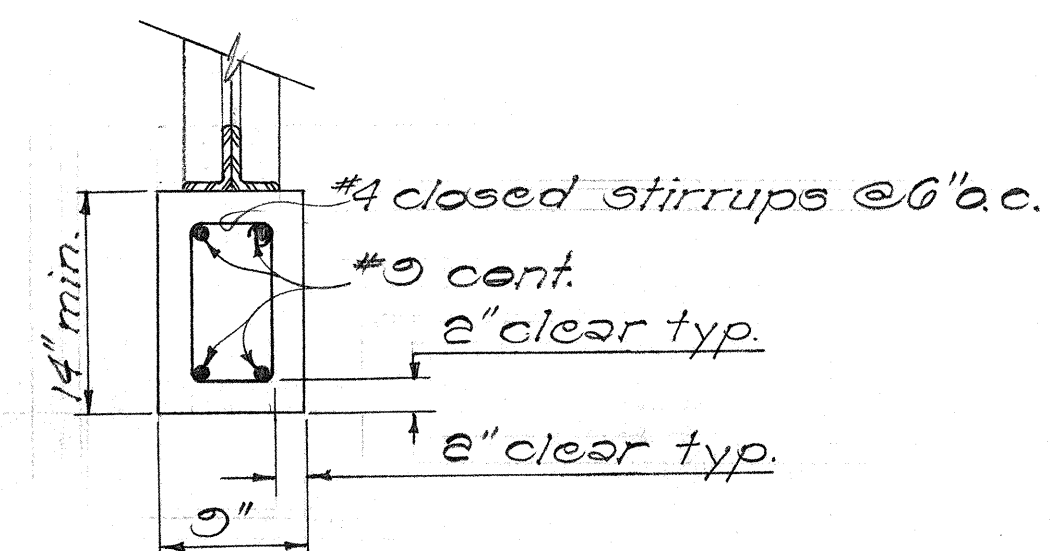
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HA-1(60):23	1976	23	181

GENERAL NOTES

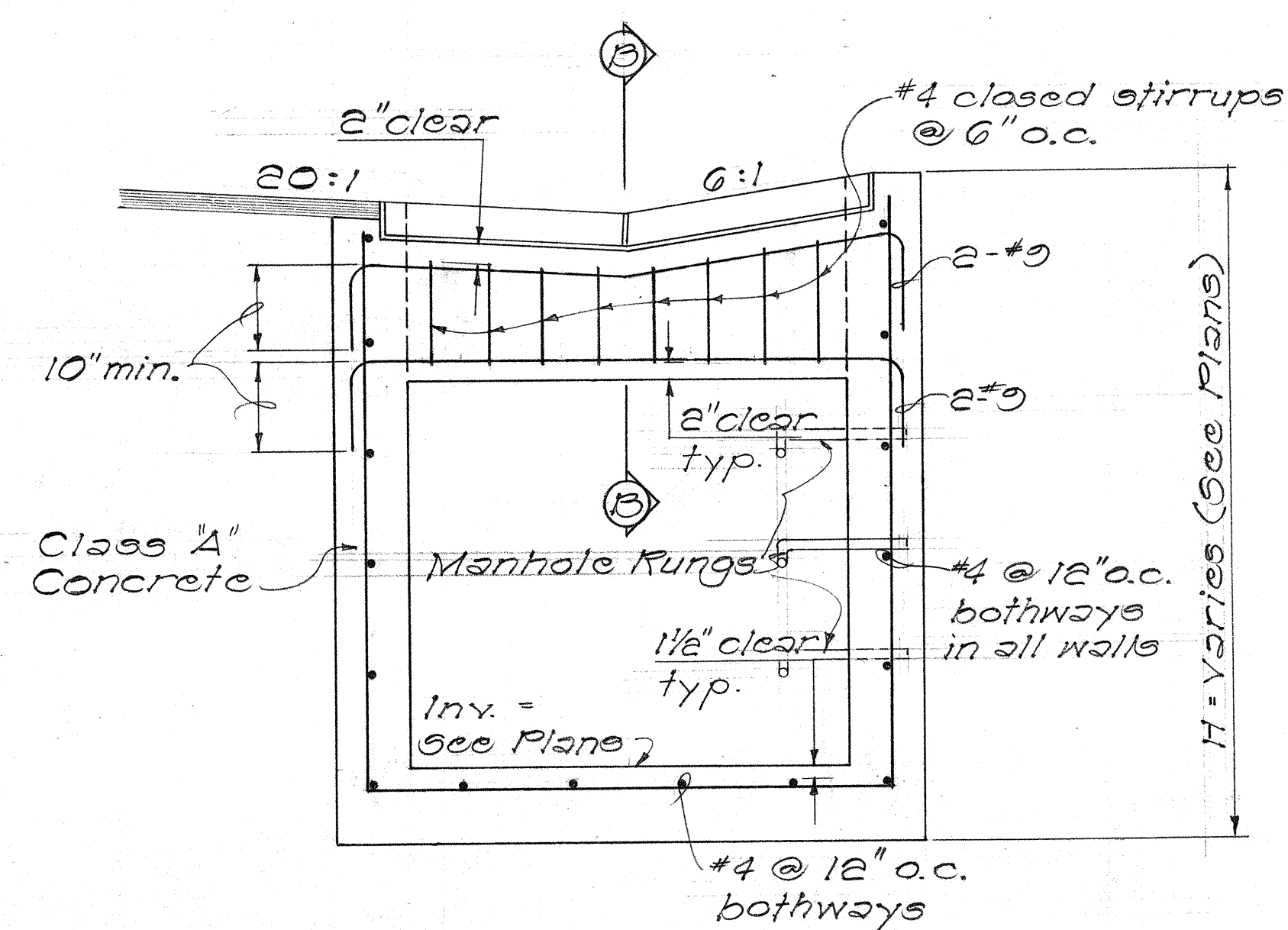
1. Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
2. All welds $\frac{1}{8}$ " unless otherwise noted.
3. The Frame and Grate materials shall conform to the specifications of ASTM Designation Structural Steel A283, Grade D and the Standard Specifications.
4. Manhole Rungs (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required when "H" is 4 feet 6 inches or less. Manhole Rungs may be placed at any location as ordered by the Engineer.



PLAN
Scale: $\frac{3}{4} = 1' - 0''$

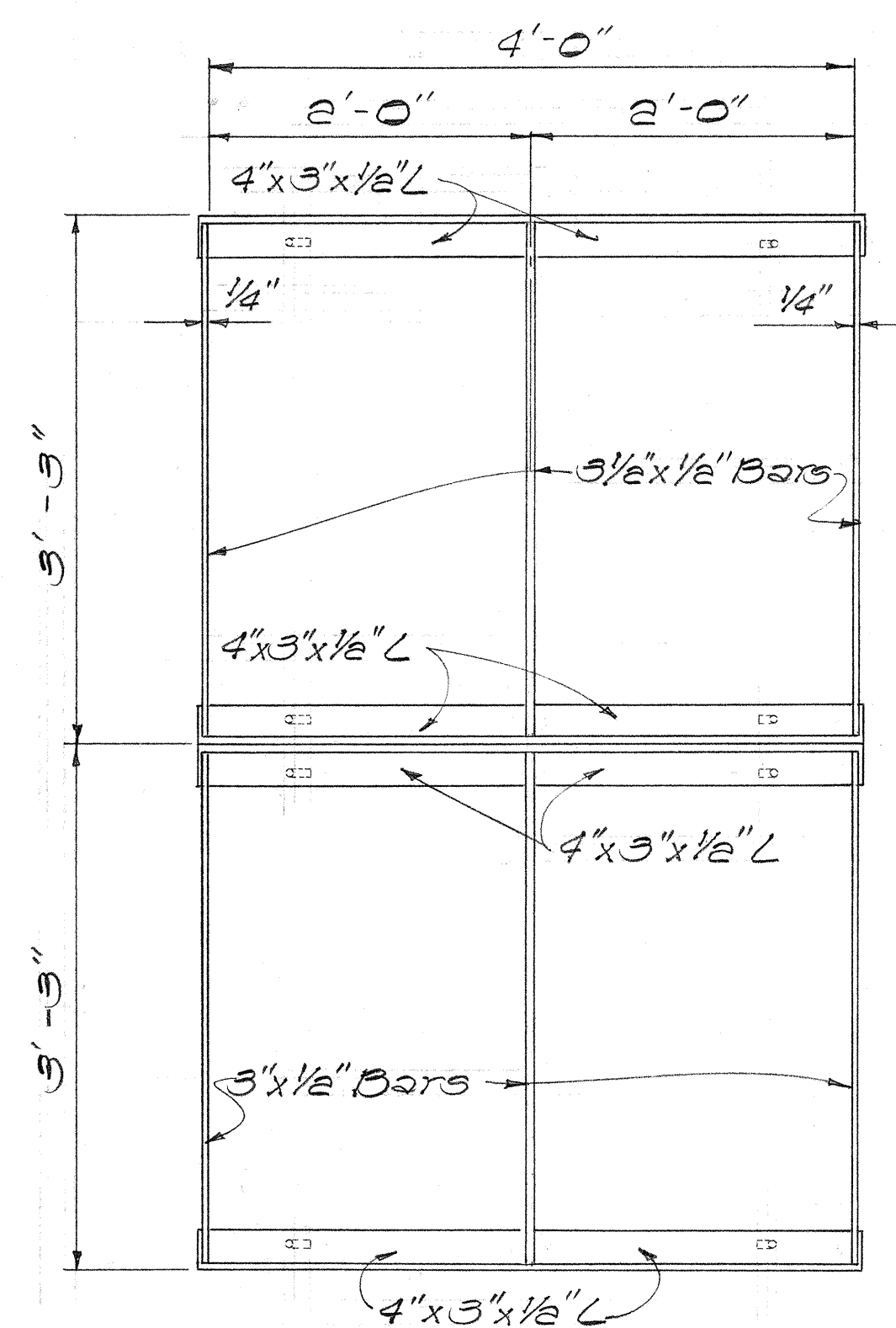


SECTION "B-B"
Scale: 1" = 1'-0"

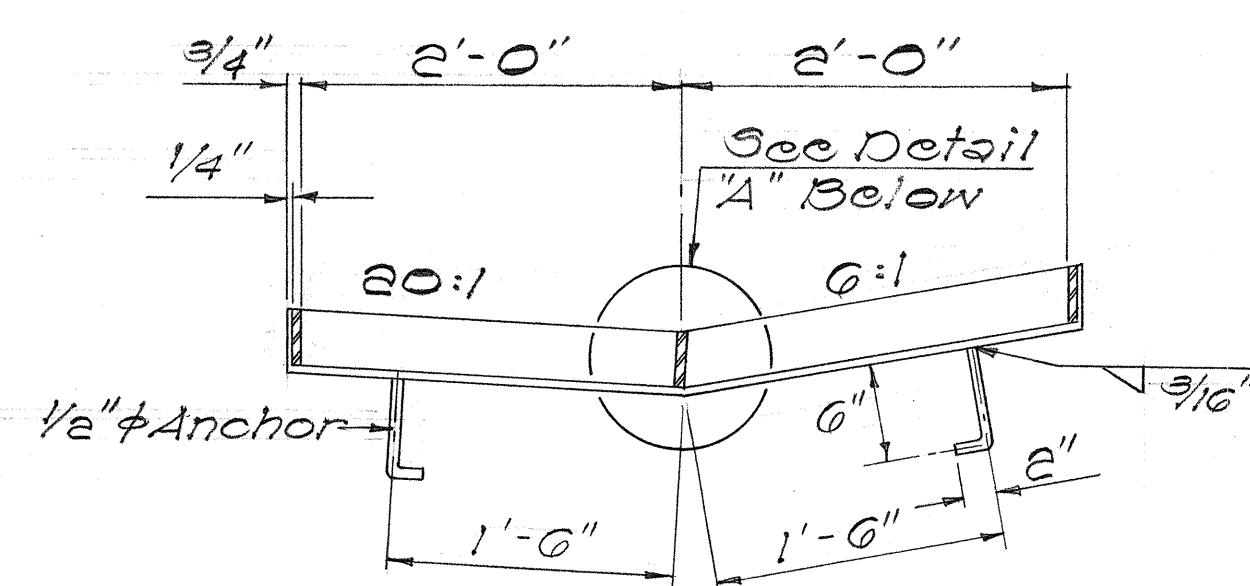


SECTION "A-A"
Scale: $\frac{3}{4}" = 1'-0"$

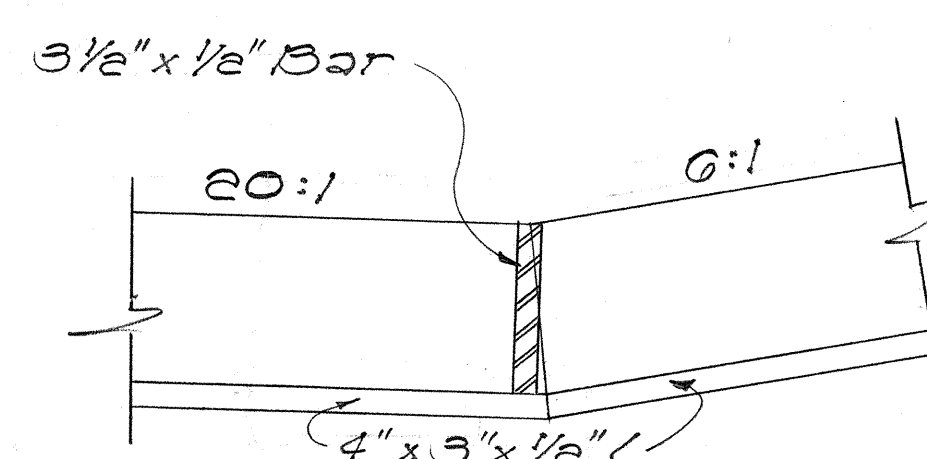
DETAILS OF TYPE G:1:20:1-4
GRADED DROP INTAKE



PLAN
Scale: 1" = 1'-0"

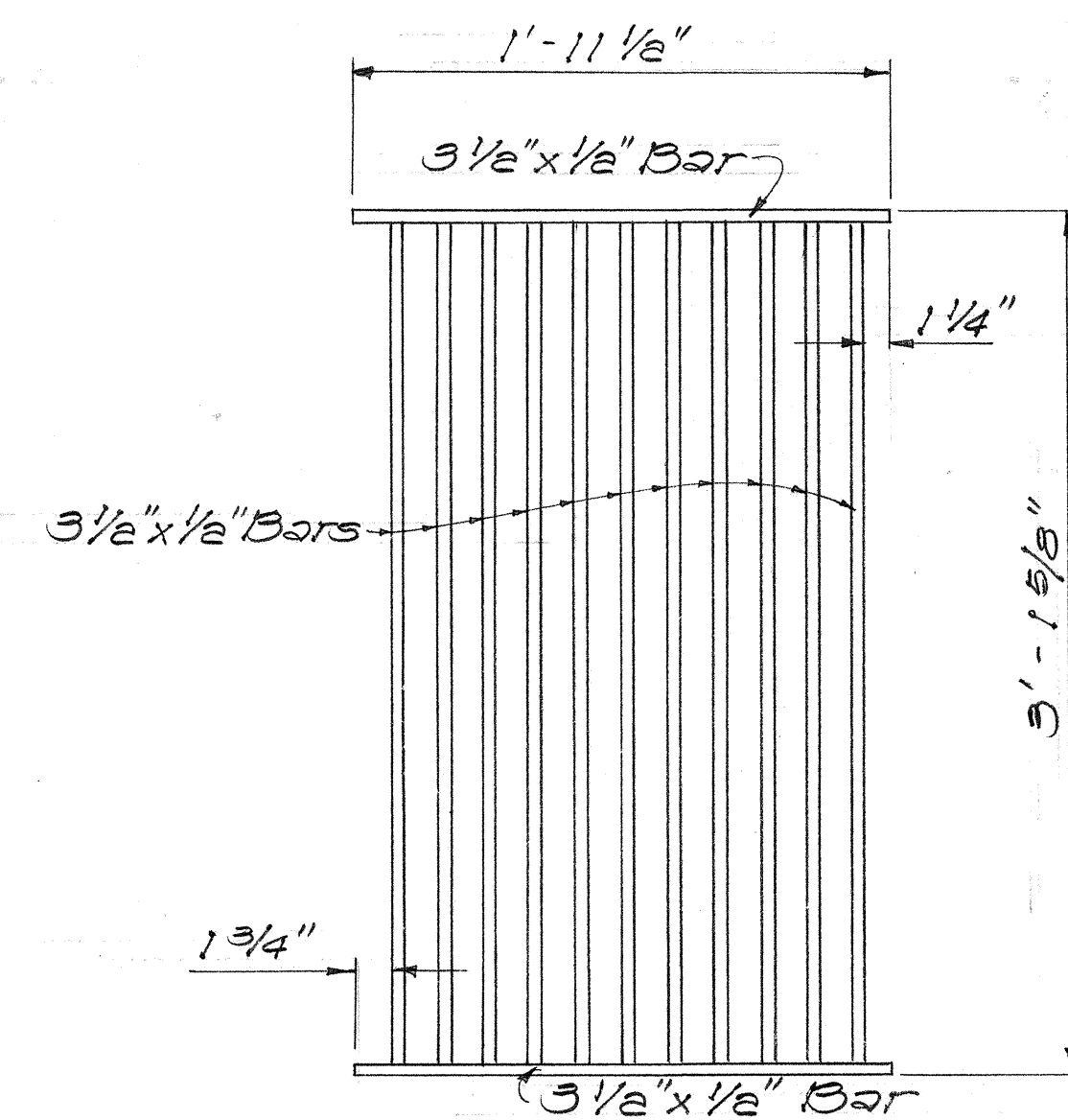


SECTION
Scale: 1"=1'-0"

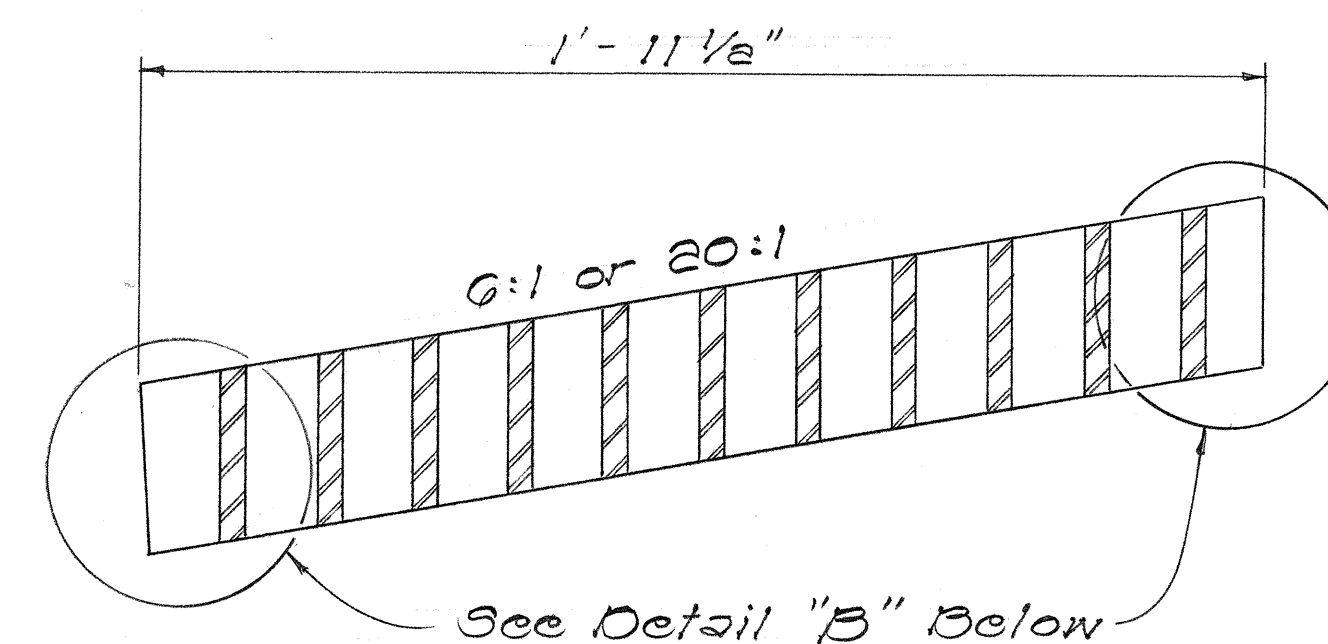


DETAIL "A"
Scale: 3" = 1'-0"

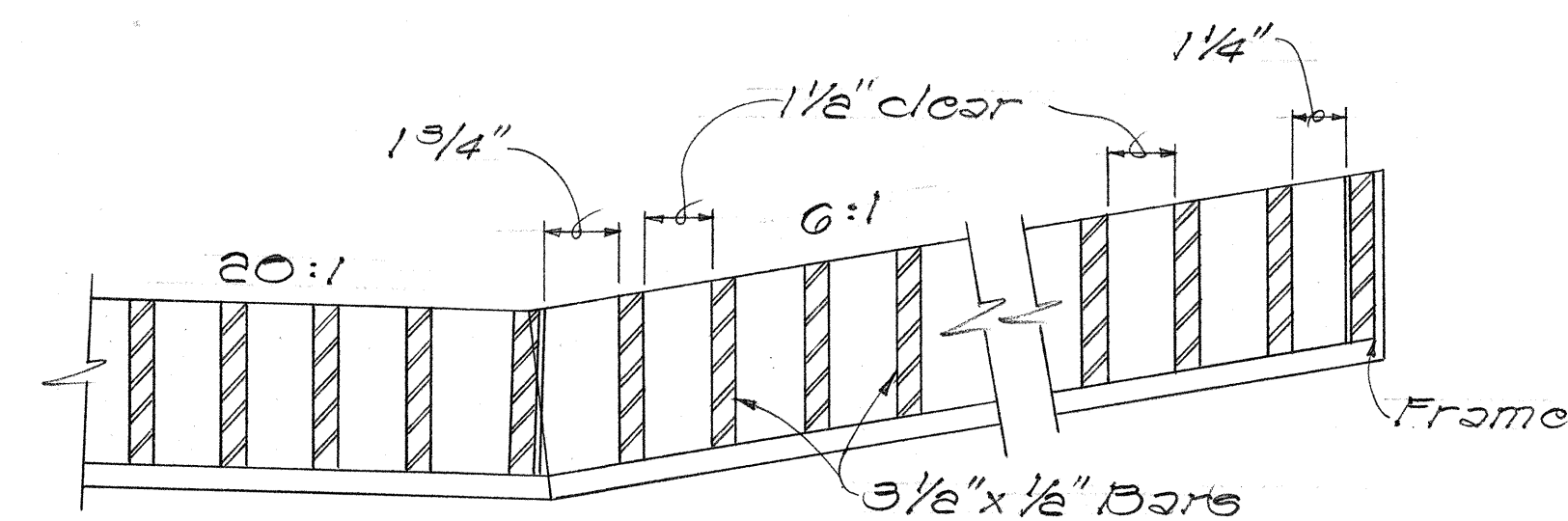
FRAME



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



SECTION
Scale: 3" = 1'-0"



DETAIL "B"
Scale: 3" = 1'-0"

GRATE

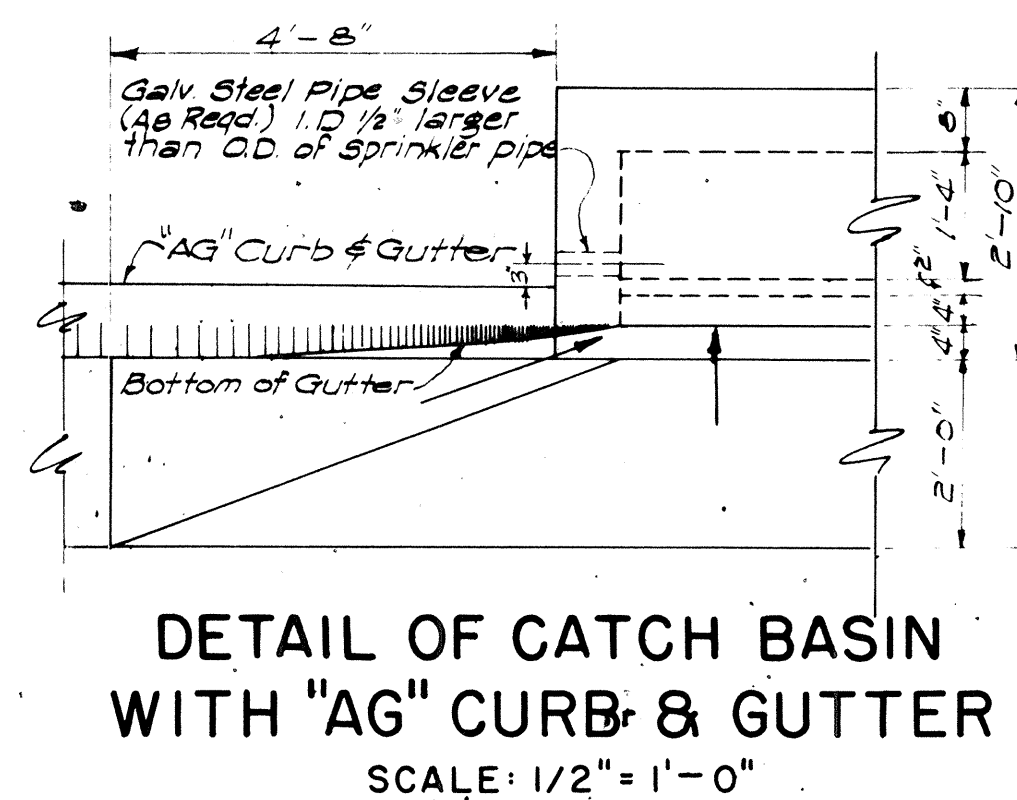
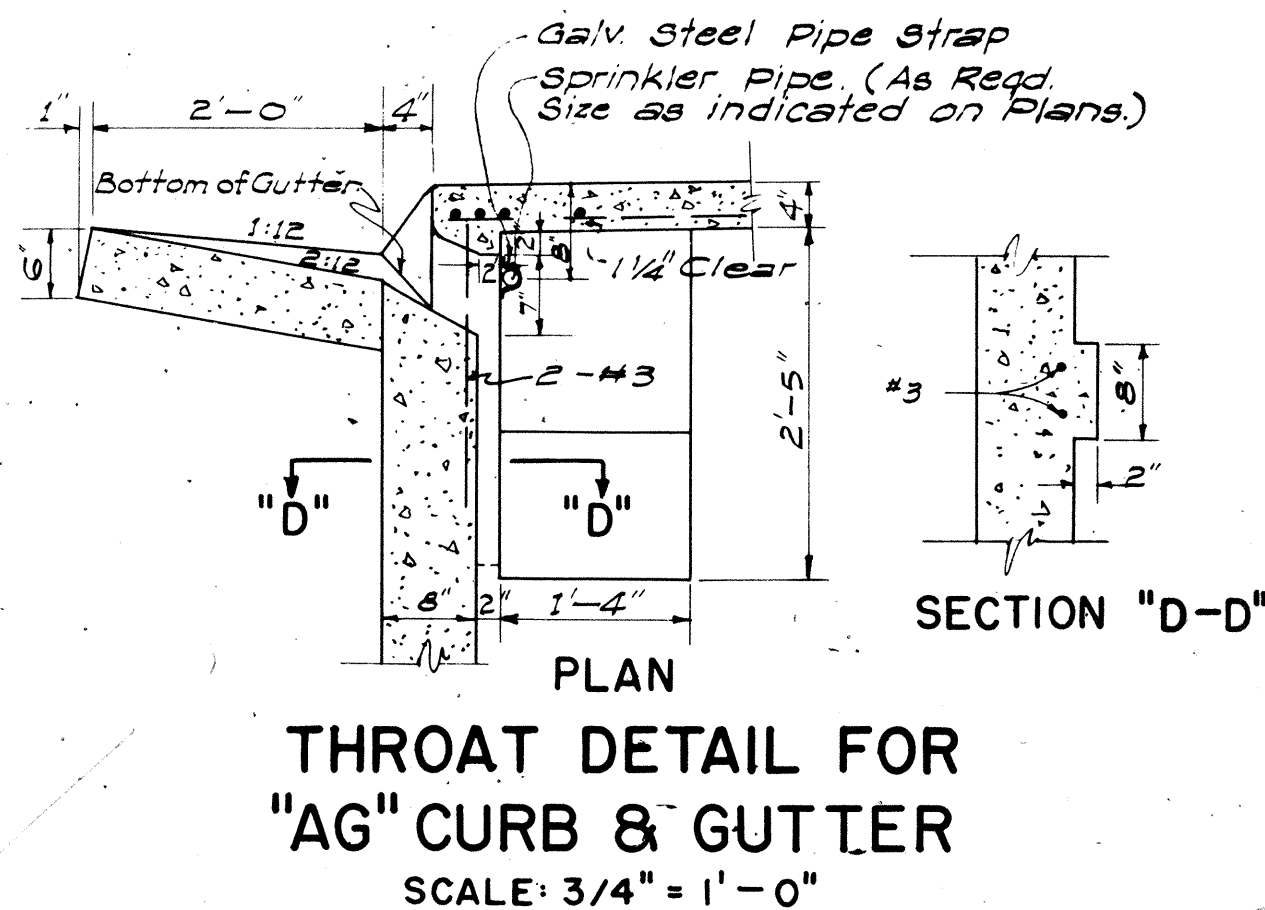
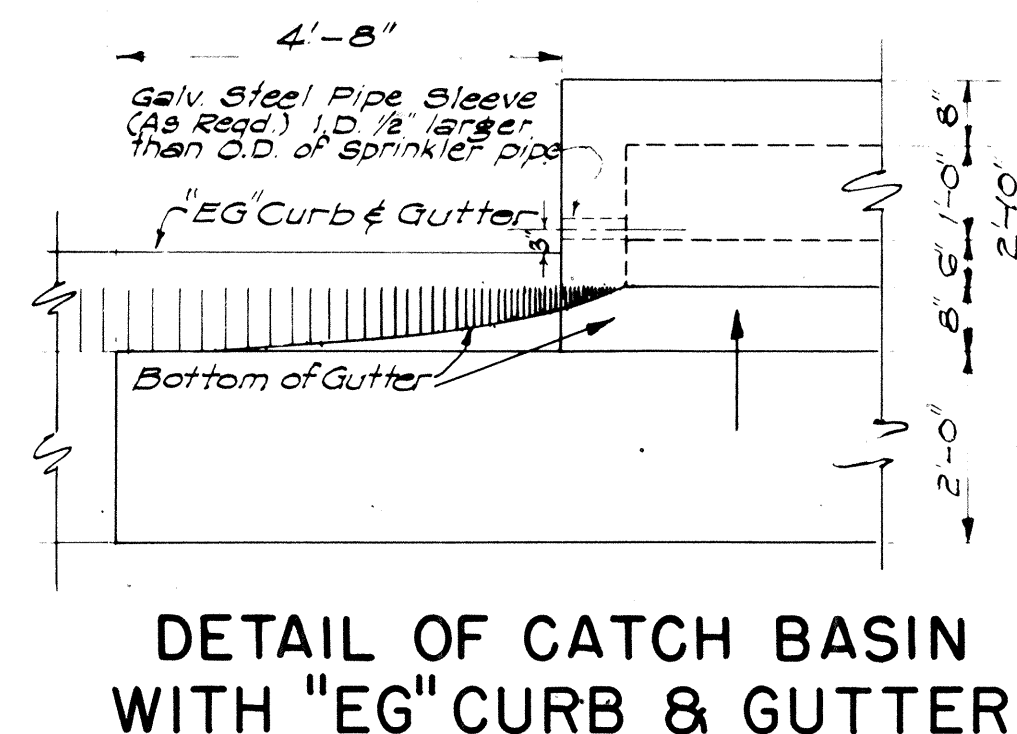
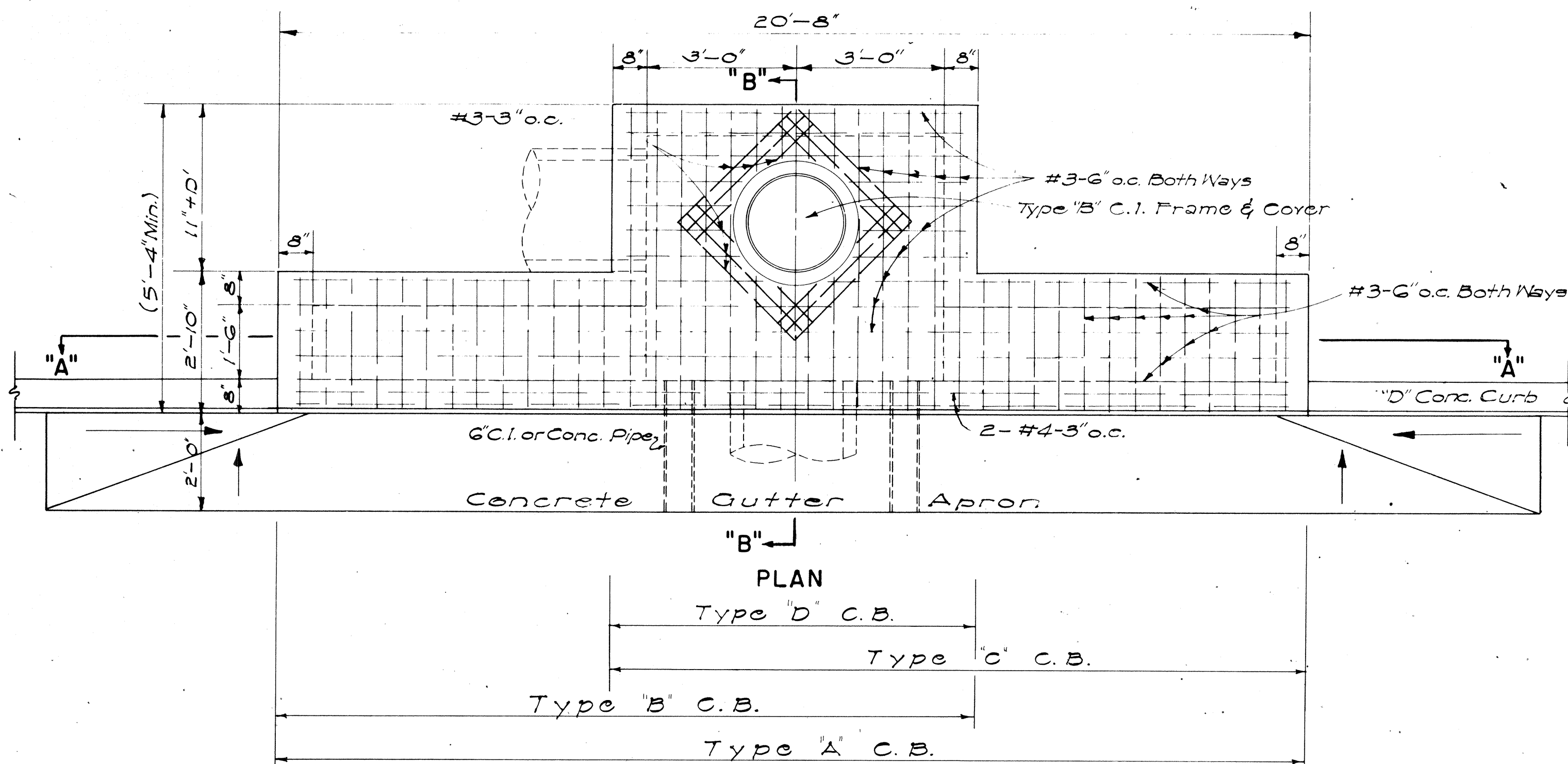
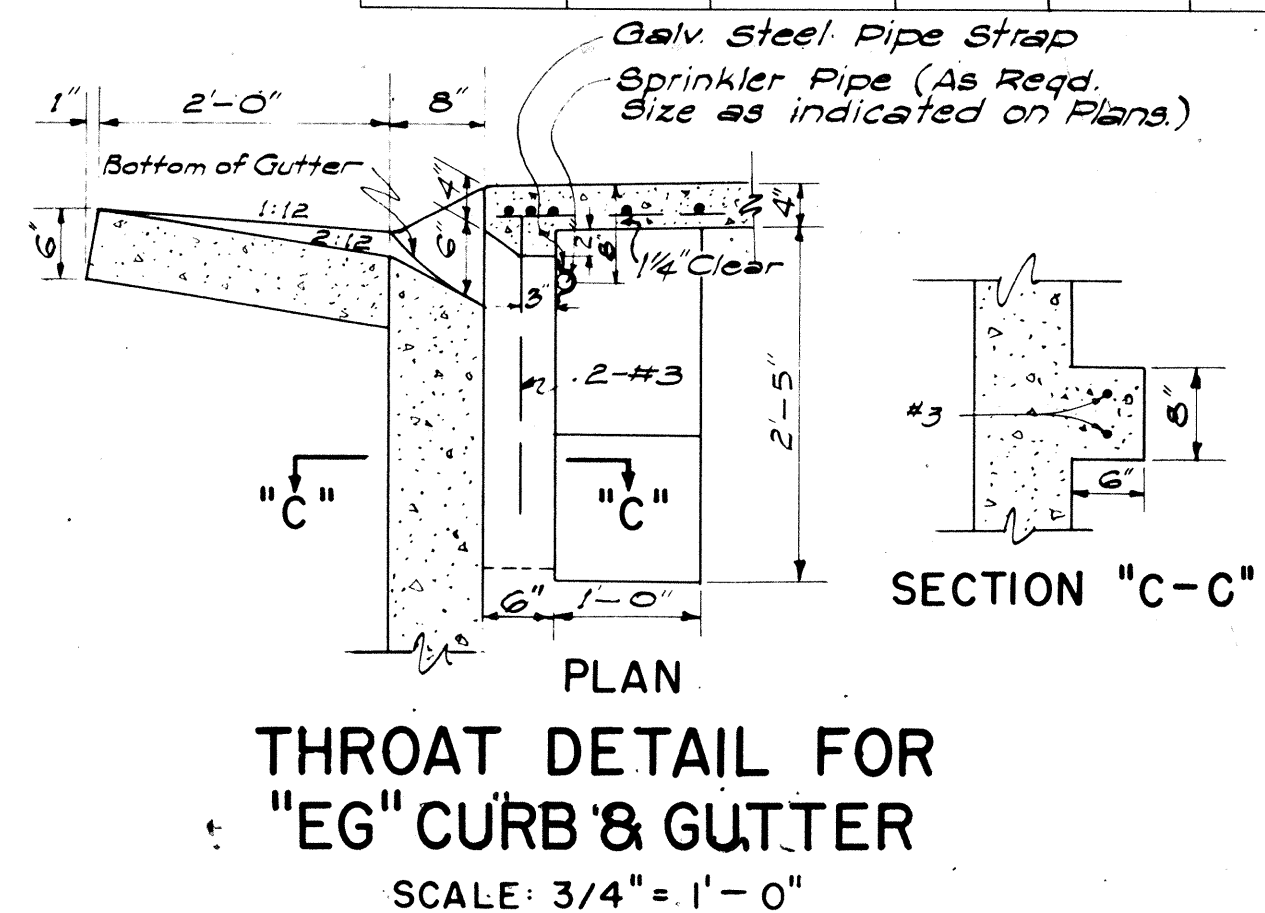
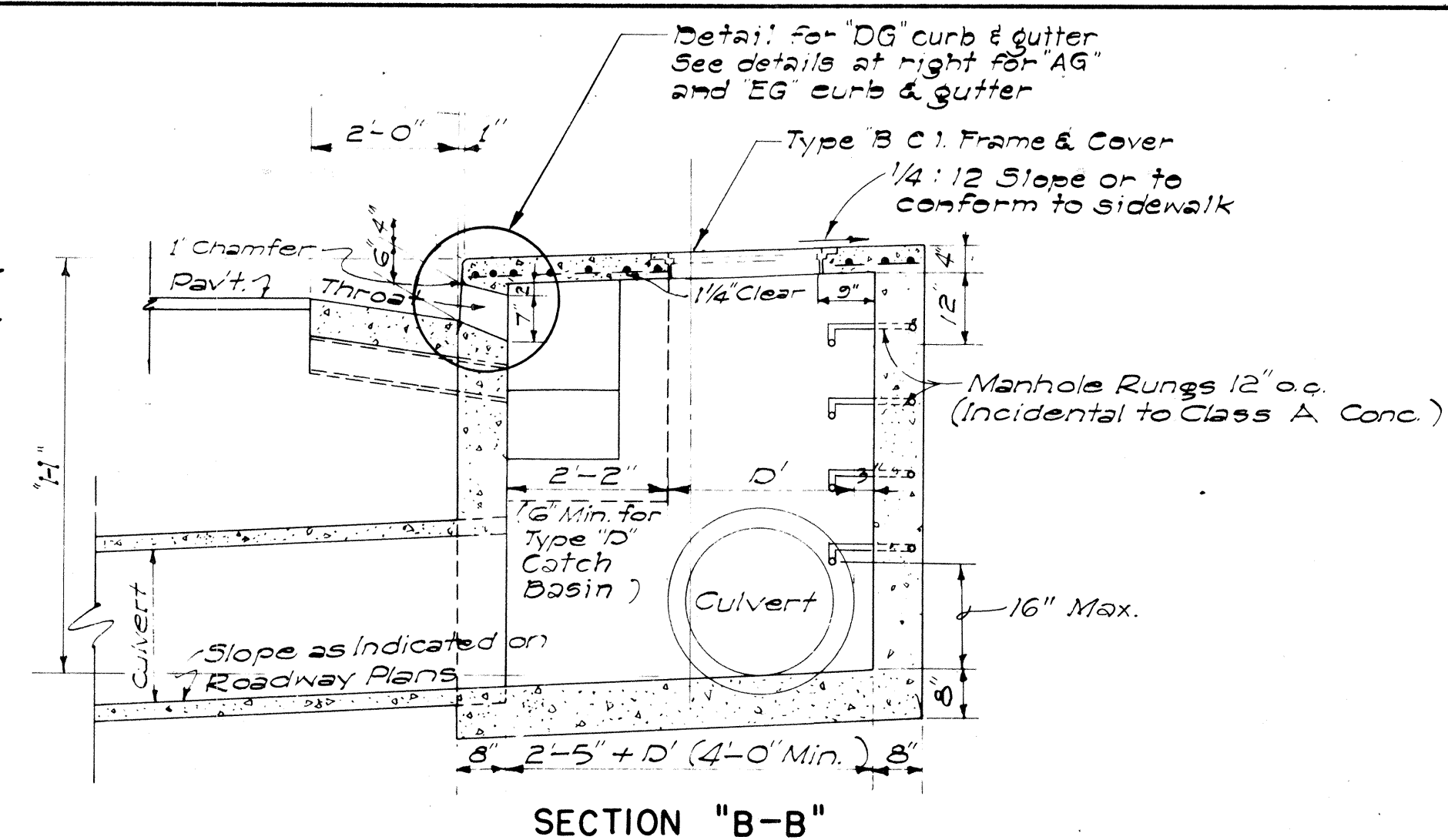
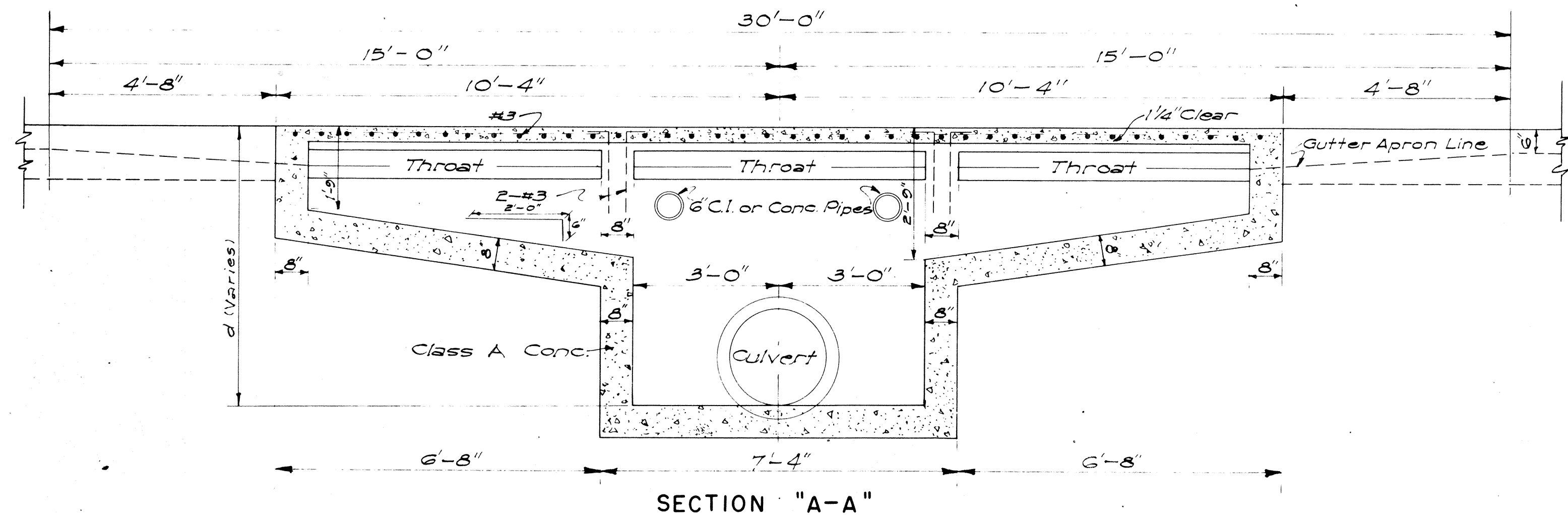
DETAILS OF TYPE G-1:20:1-4
STEEL FRAME AND GRATES

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

F.A.I. Proj. No. I-H1-1(60):23

Scale: As Shown Date: Aug. 1976

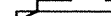
SHEET No.37H OF 41 H SHEETS



DETAILS OF TYPES "A", "B", "C" AND "D" CATCH BASINS

GENERAL NOTES

ESTIMATED QUANTITIES

Type	Class A Conc	Struct. Exc.	Reinf. Steel	Gutter Length
"A" 	7.5 c.y.	24.7 c.y.	145 lb.	30' - 0"
"B" 	6.0 c.y.	21.5 c.y.	108 lb.	23' - 4"
"C" 	6.0 c.y.	21.5 c.y.	108 lb.	23' - 4"
"D" 	4.9 c.y.	16.5 c.y.	77 lb.	16' - 8"

1. Quantities based on $d' = 5.75'$ and $D' = 30''$.
2. Quantities do not include concrete for Gutter Apron.
3. The Contractor shall install two 6" Cast Iron or Concrete Pipes as incidental to Class A Concrete for Construction Drainage. The Engineer shall determine the exact location in the field.
4. Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole.
5. The Contractor shall install Galvanized Steel Pipe Sleeves and Straps as incidental to Sprinkler System.
6. The type of curb and/or gutter (Type 1, 2, 3, etc.) shall conform to the type specified on the roadway plans.
7. Manhole Rungs (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Type "B" Cast Iron Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

12-17-64
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-17-6
DATE

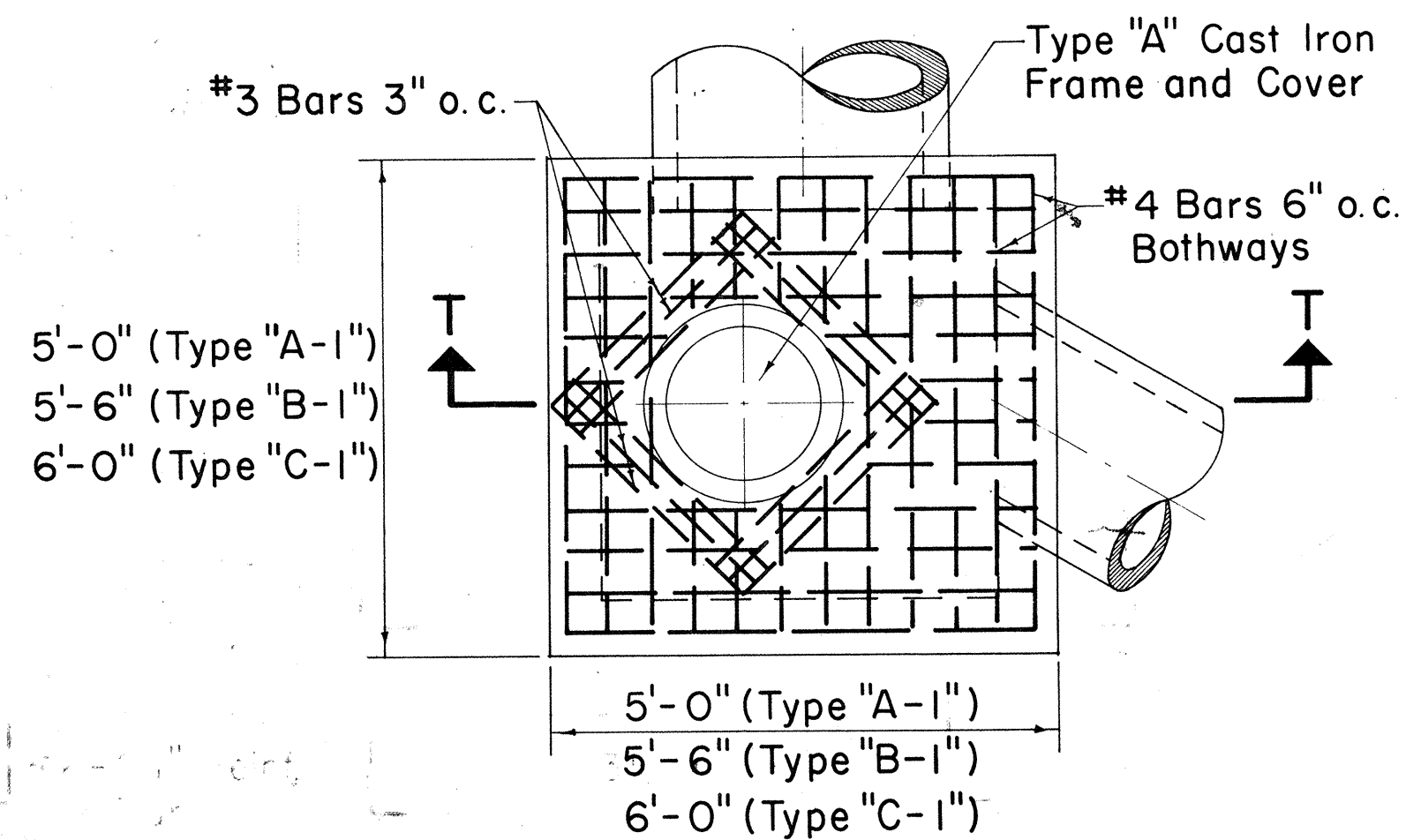
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
CATCH BASINS

Scale: As Noted

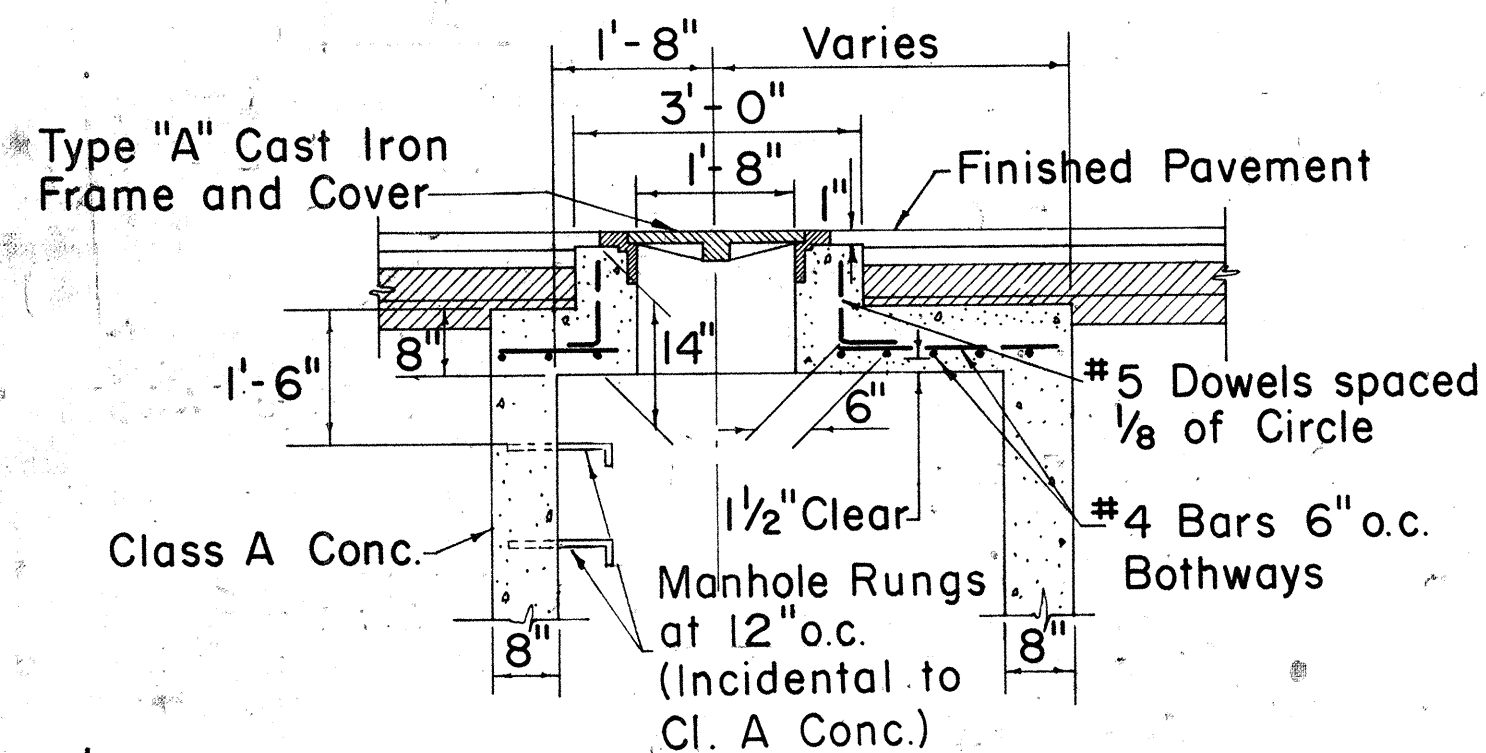
Date: July, 1969

SHEET N^o 38H OF 41H SHEETS

DH 1



PLAN



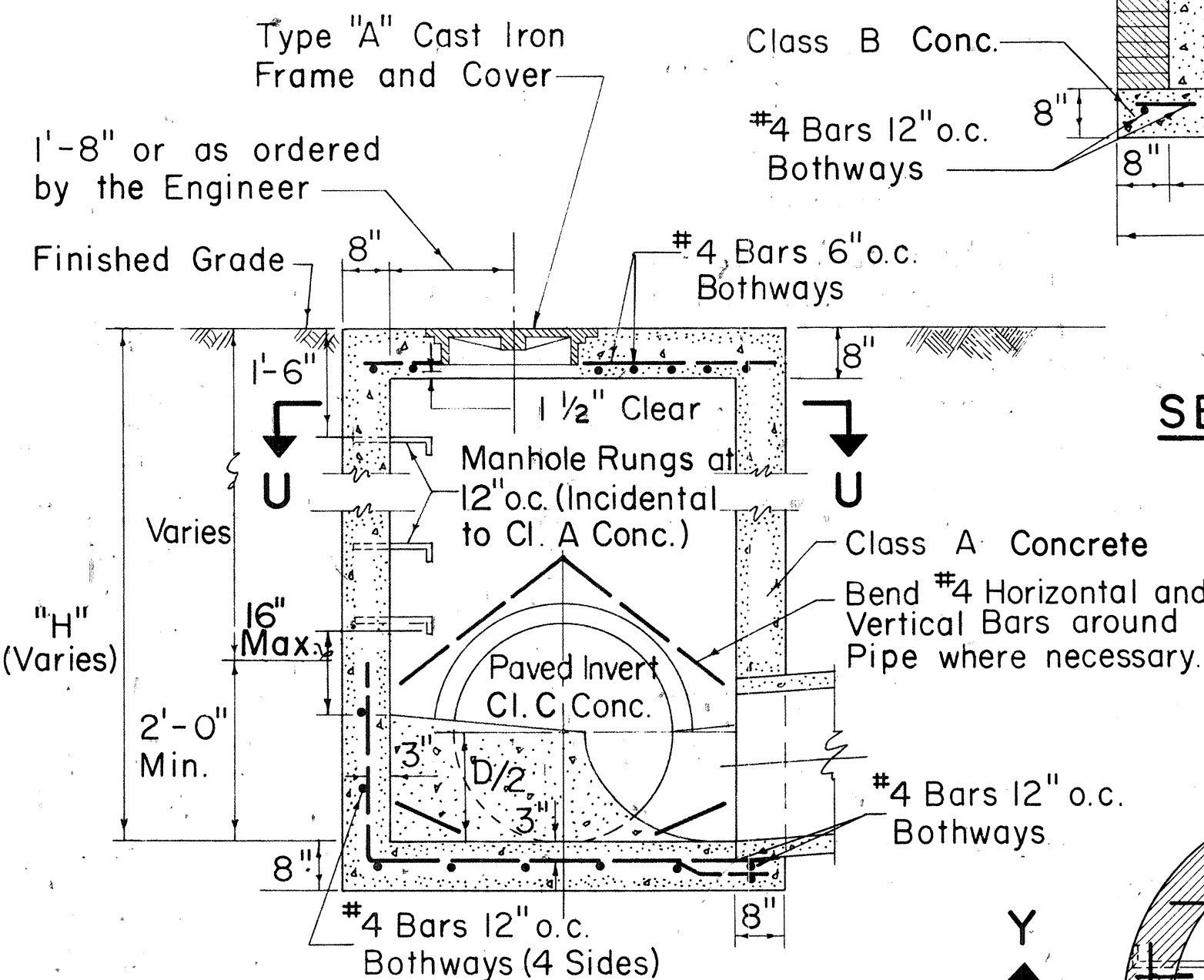
SECTION T-T

TYPE "A-1", "B-1", & "C-1"
STORM DRAIN MANHOLE
TOP DETAIL UNDER PAVEMENT
Scale: 1/2" = 1'-0"

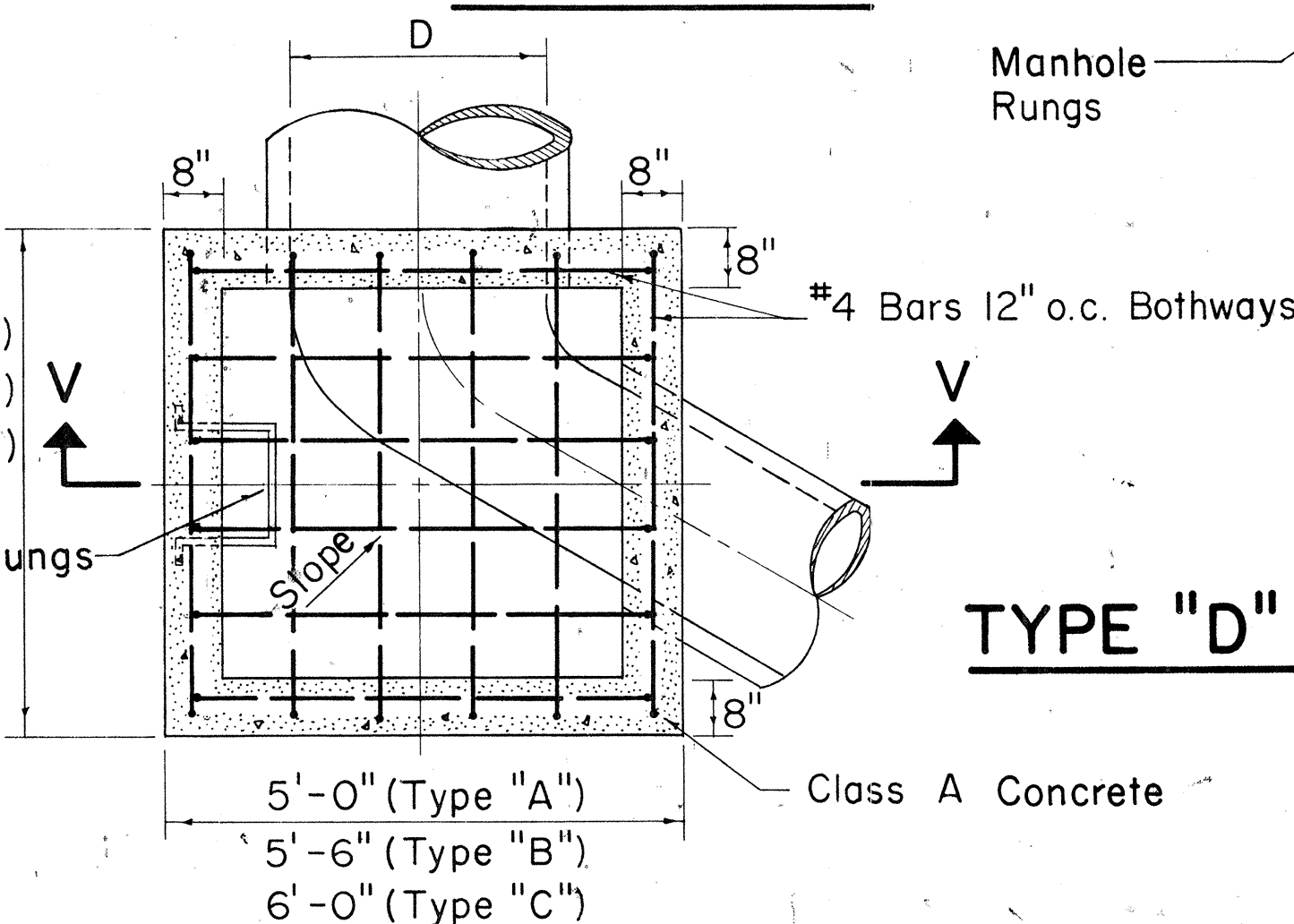
Note:
Bottom detail similar to Type "A", "B", & "C"

GENERAL NOTES

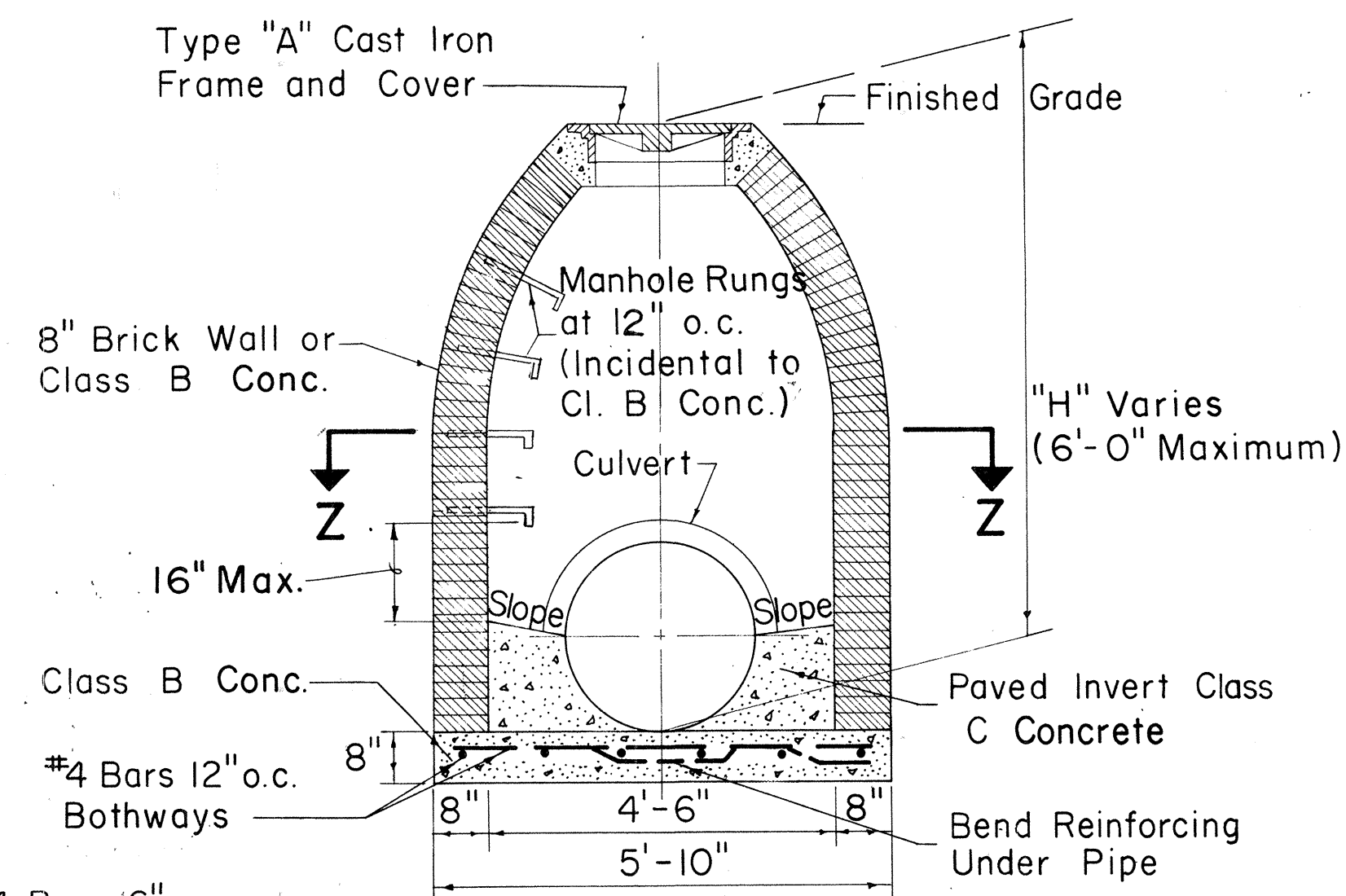
- Culvert shall enter and leave S.D.M.H. from any position and in the direction indicated by the plans or ordered by the Engineer.
- Manhole Rungs (12" o.c.) are required when "H" is greater than 4'-6". Only one rung (16" from the bottom) is required if "H" is 4'-6" or less. Type "A" C.I. Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.



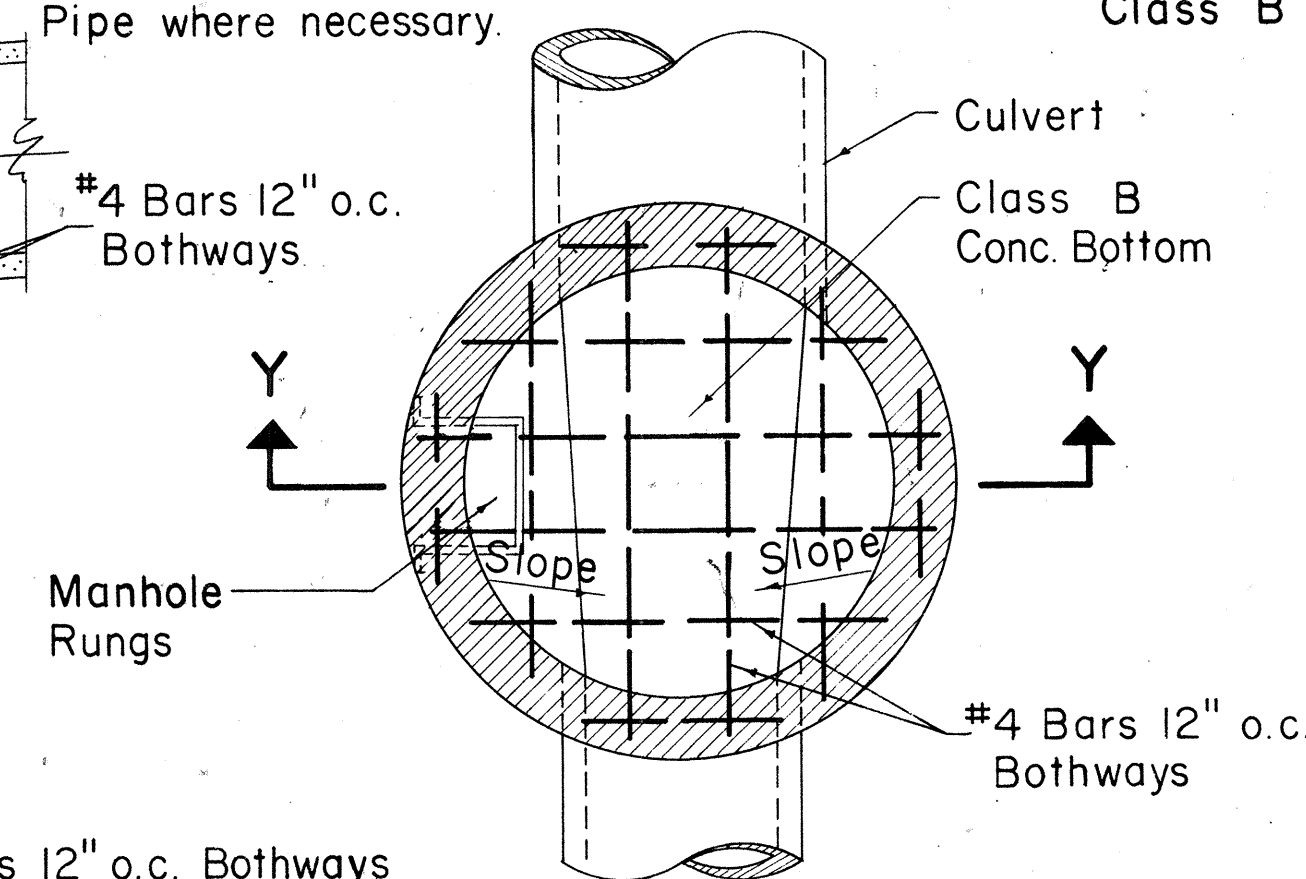
SECTION V-V



SECTION U-U
TYPE "A", "B", & "C"
S.D.M.H.
Scale: 1/2" = 1'-0"

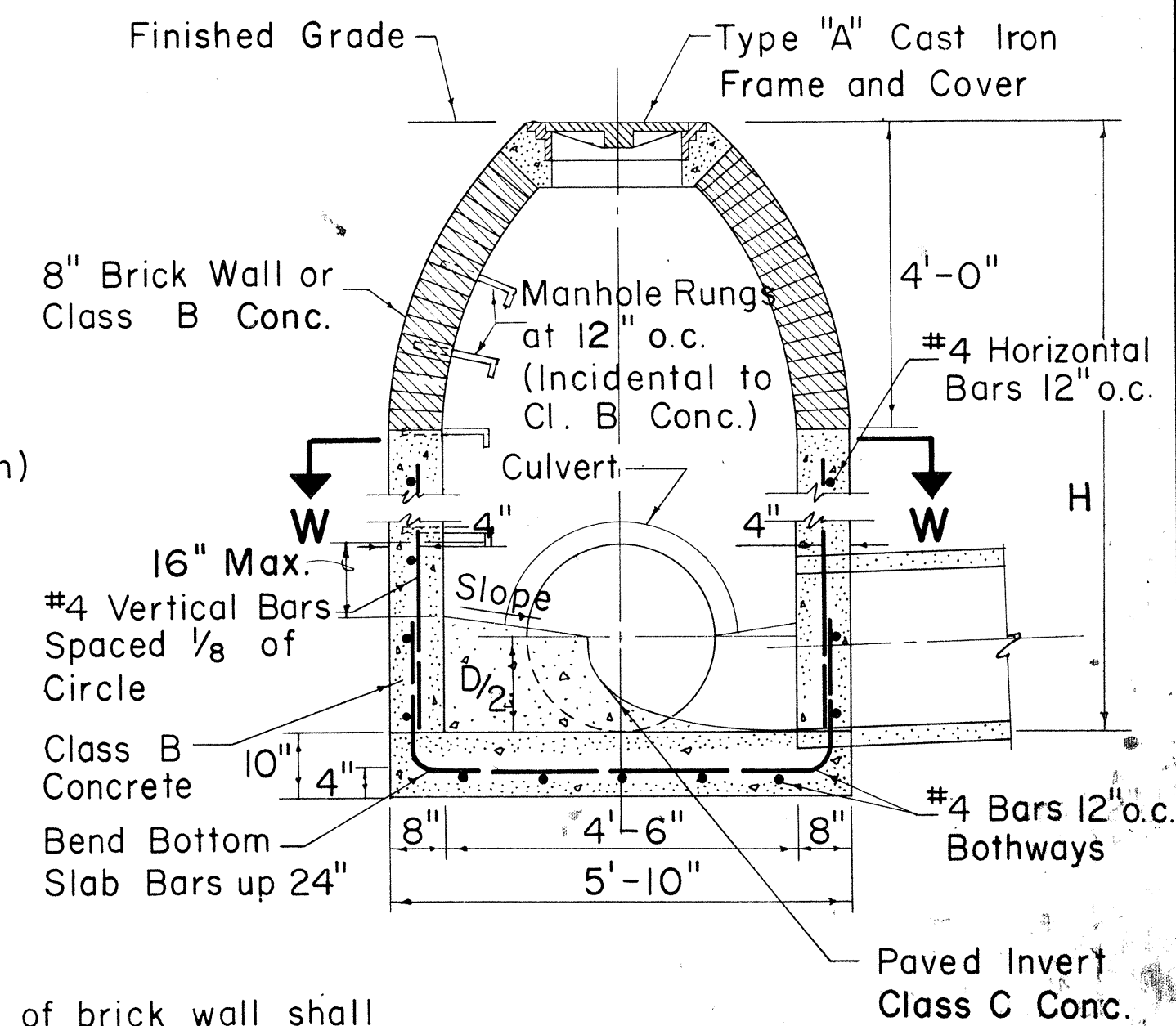


SECTION Y-Y

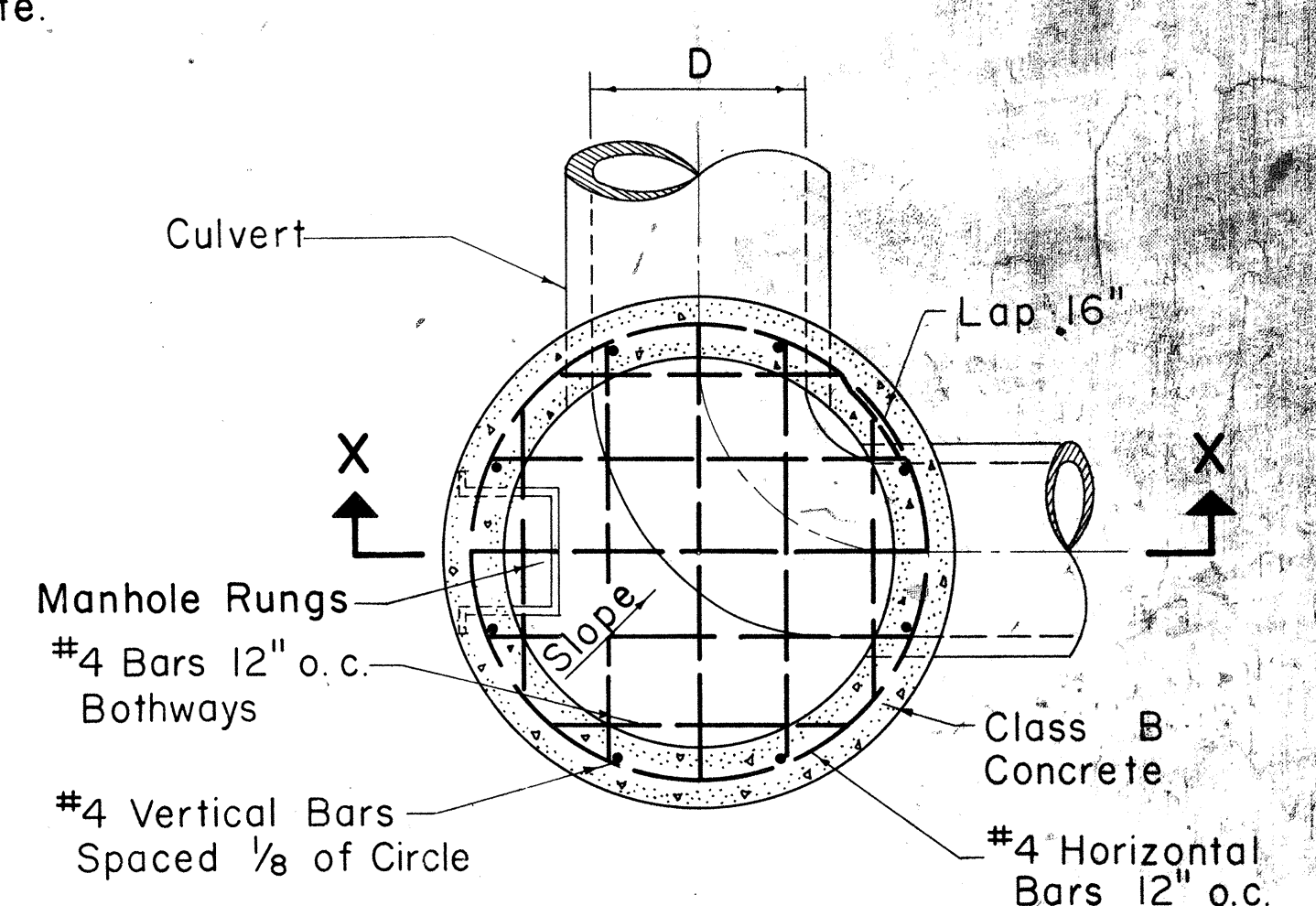


SECTION Z-Z

TYPE "D" STORM DRAIN MANHOLE
Scale: 1/2" = 1'-0"



SECTION X-X



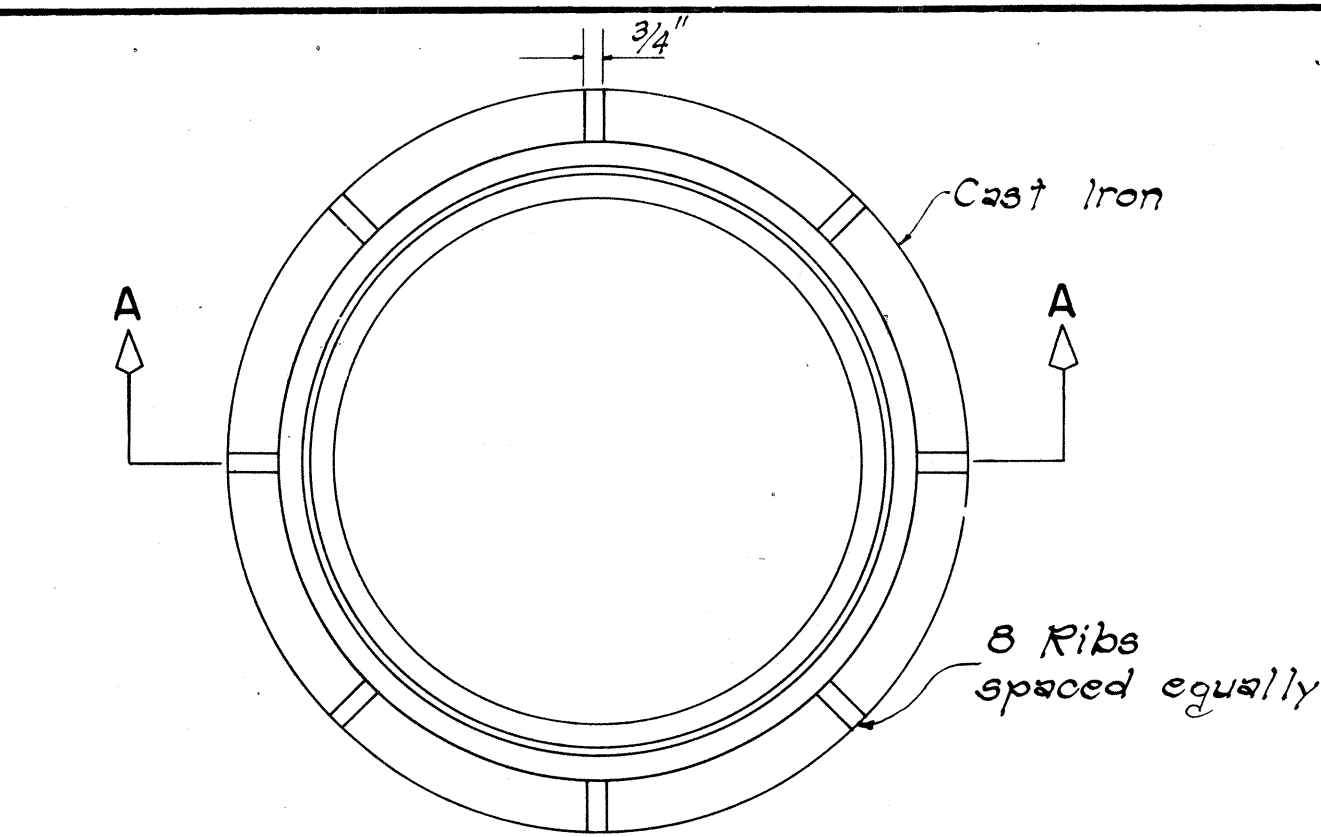
SECTION W-W

TYPE "E" STORM DRAIN MANHOLE
Scale: 1/2" = 1'-0"

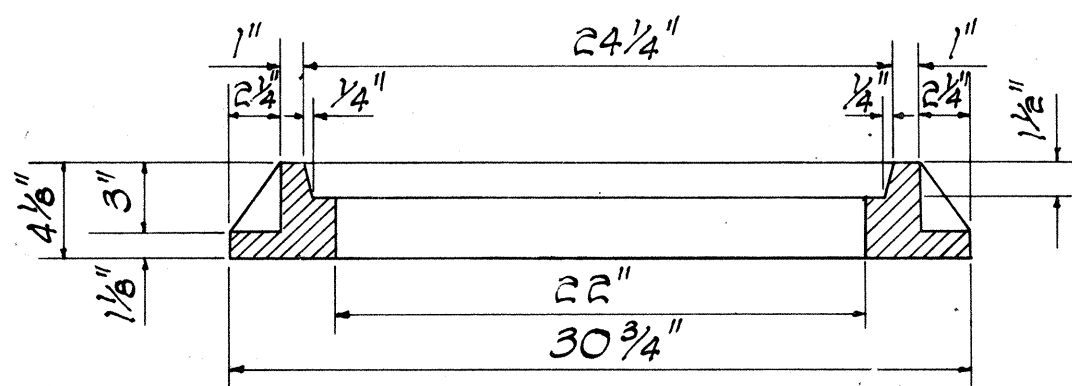
NO.	REVISION	APPROVED BY	DATE
1	Spacing on Manhole Rungs to conform to OSHA.	H.T.	1-21-75

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS STORM DRAIN MANHOLES
Scales: As Noted Date: July, 1969

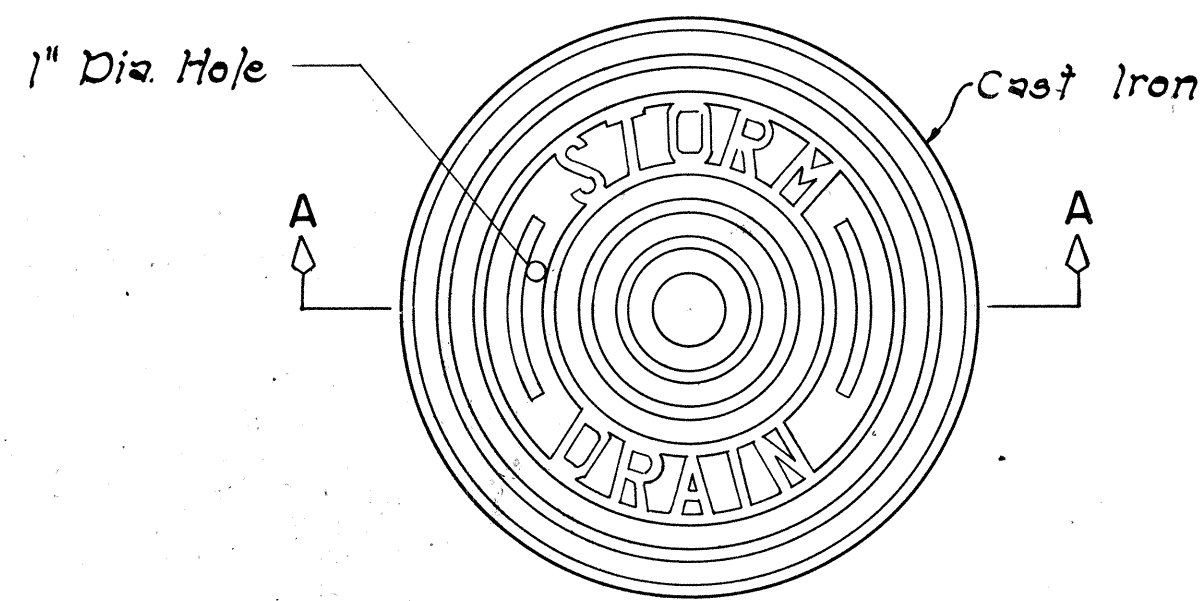
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1-1 (60):23	1976	102	181



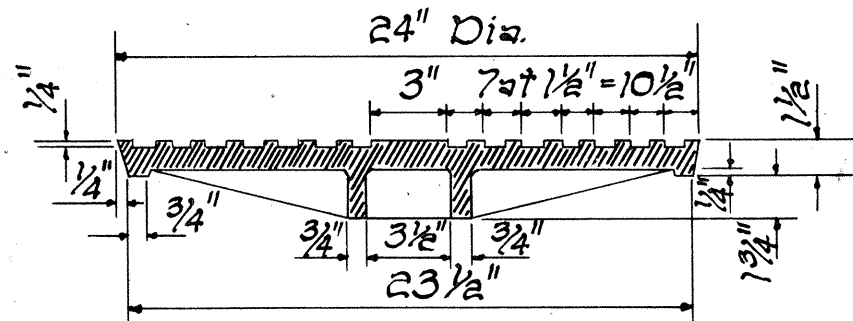
PLAN



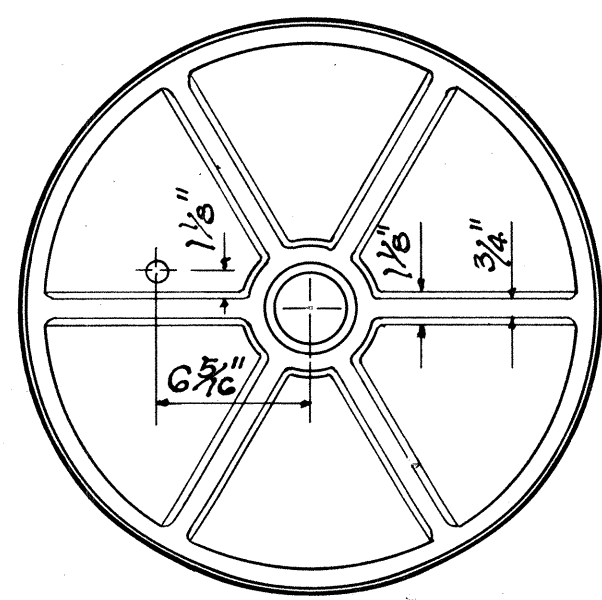
SECTION A-A



PLAN



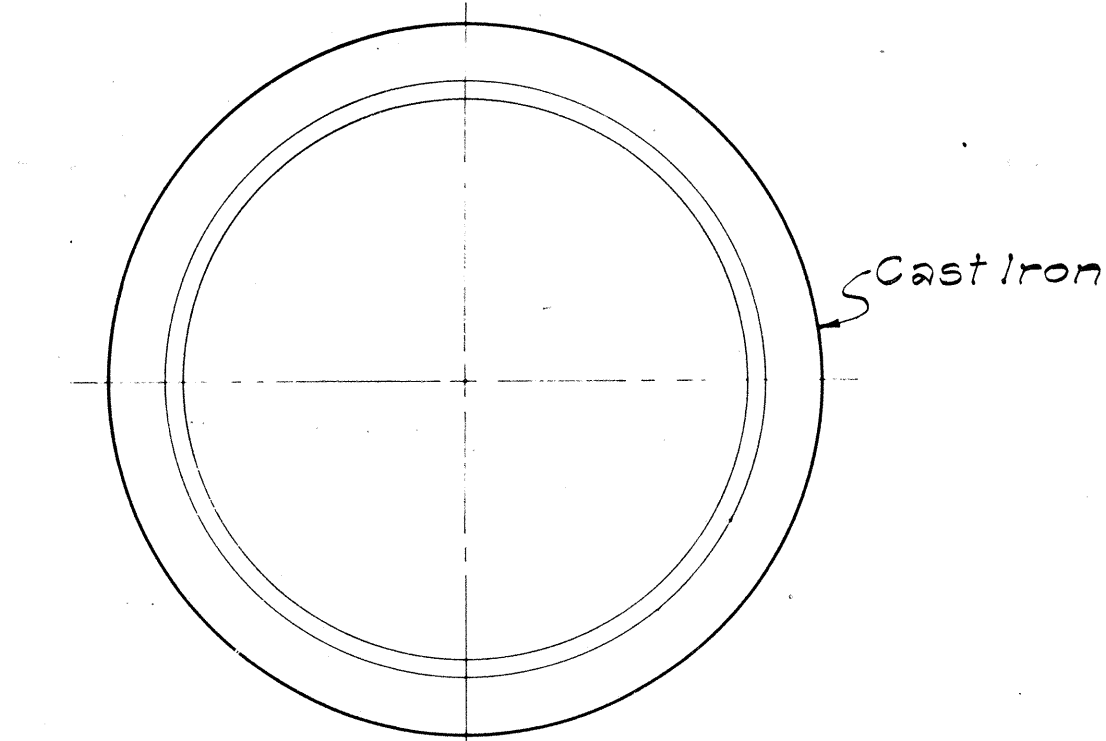
SECTION A-A



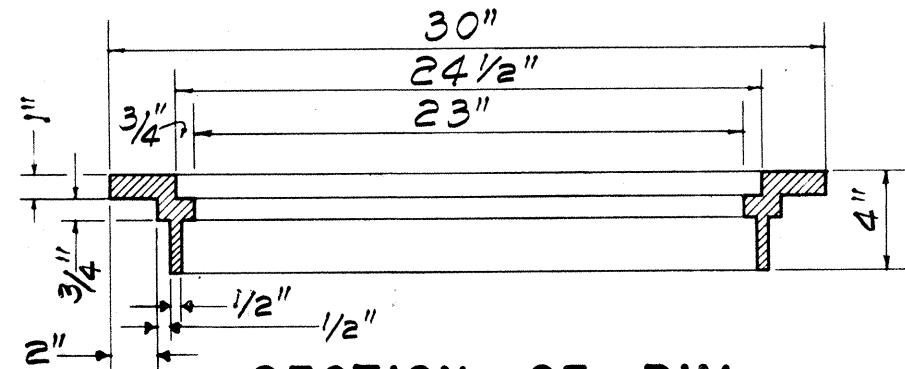
BOTTOM VIEW OF COVER

DETAILS OF TYPE "P"
CAST IRON FRAME AND COVER

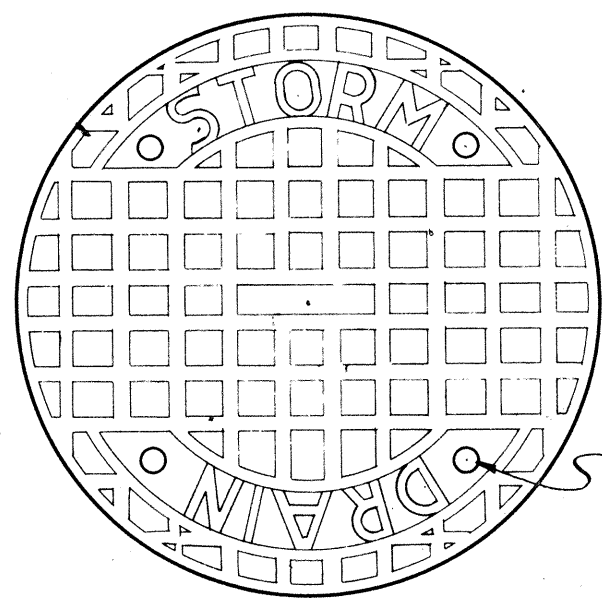
SCALE: 1-1/2" = 1'-0"



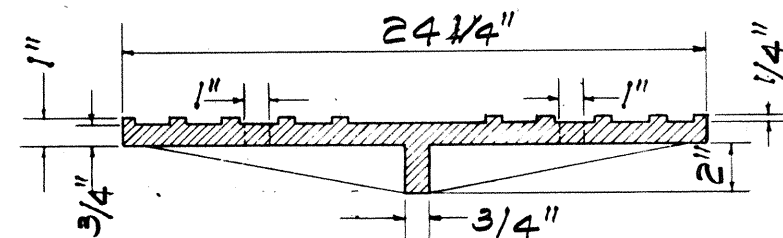
PLAN OF RIM



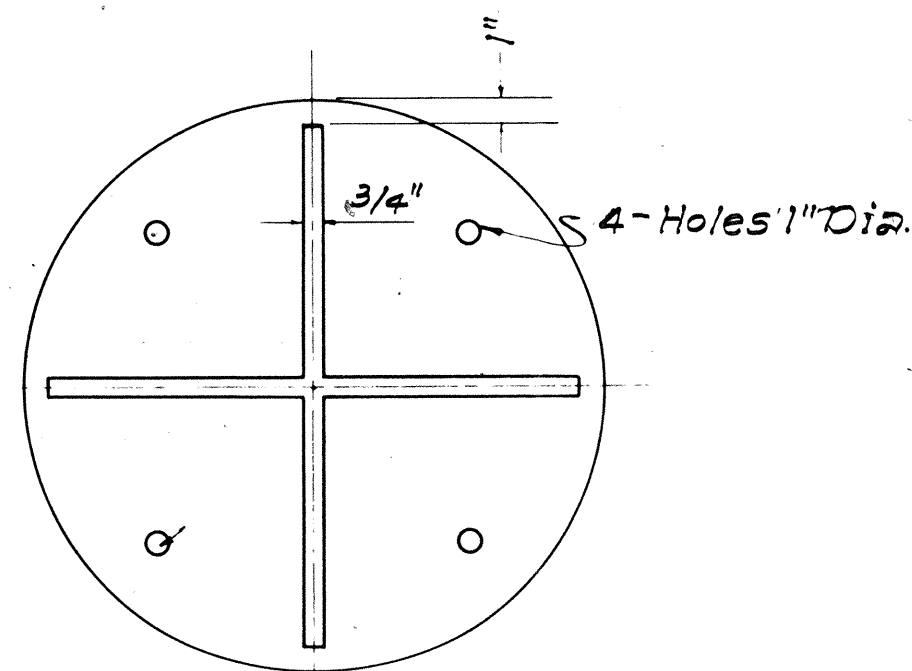
SECTION OF RIM



TOP VIEW OF COVER



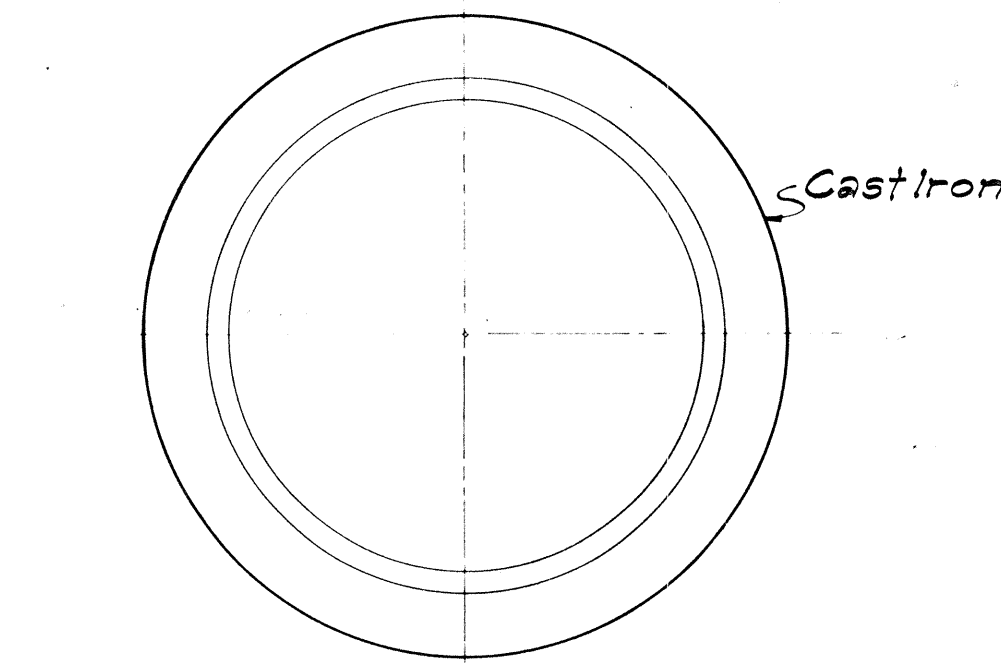
SECTION



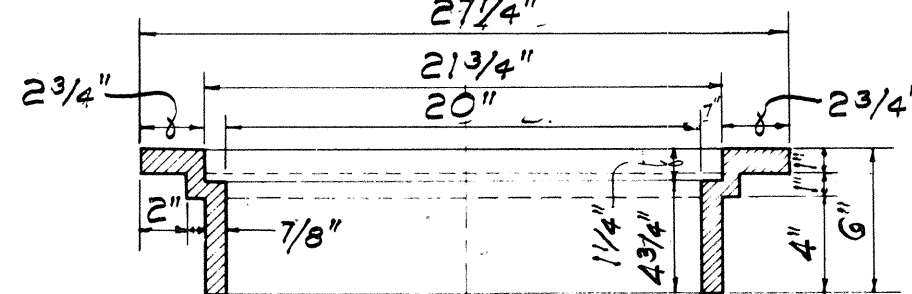
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B"
CAST IRON FRAME AND COVER

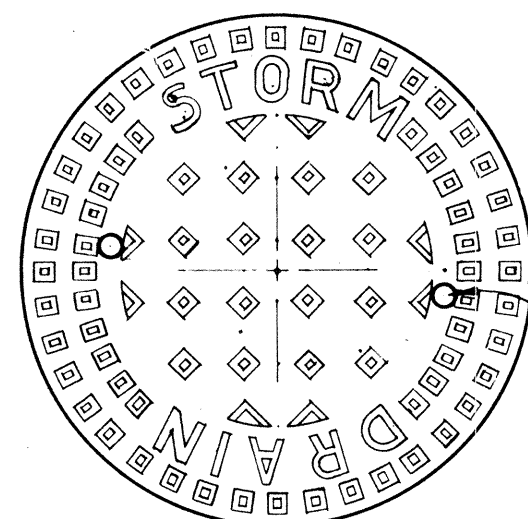
SCALE: 1-1/2" = 1'-0"



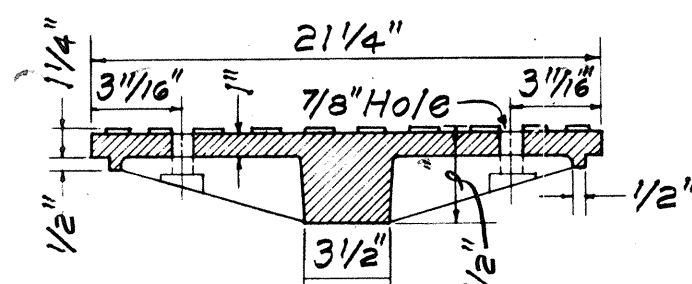
PLAN OF RIM



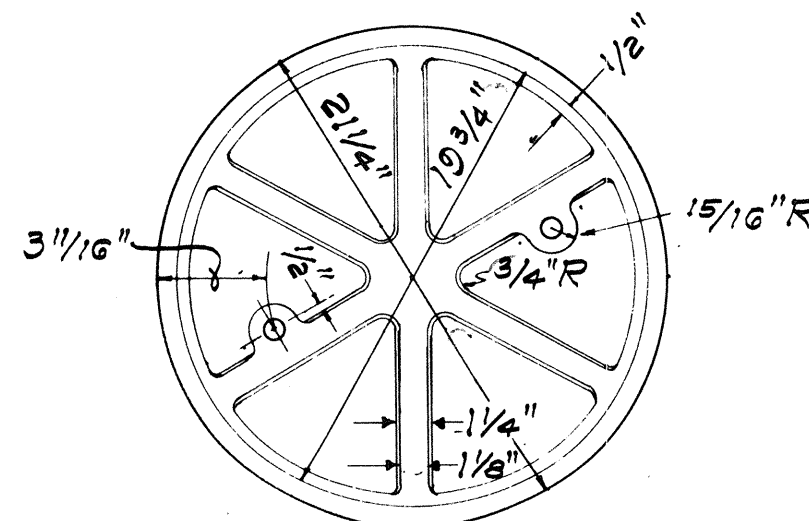
SECTION OF RIM



TOP VIEW OF COVER



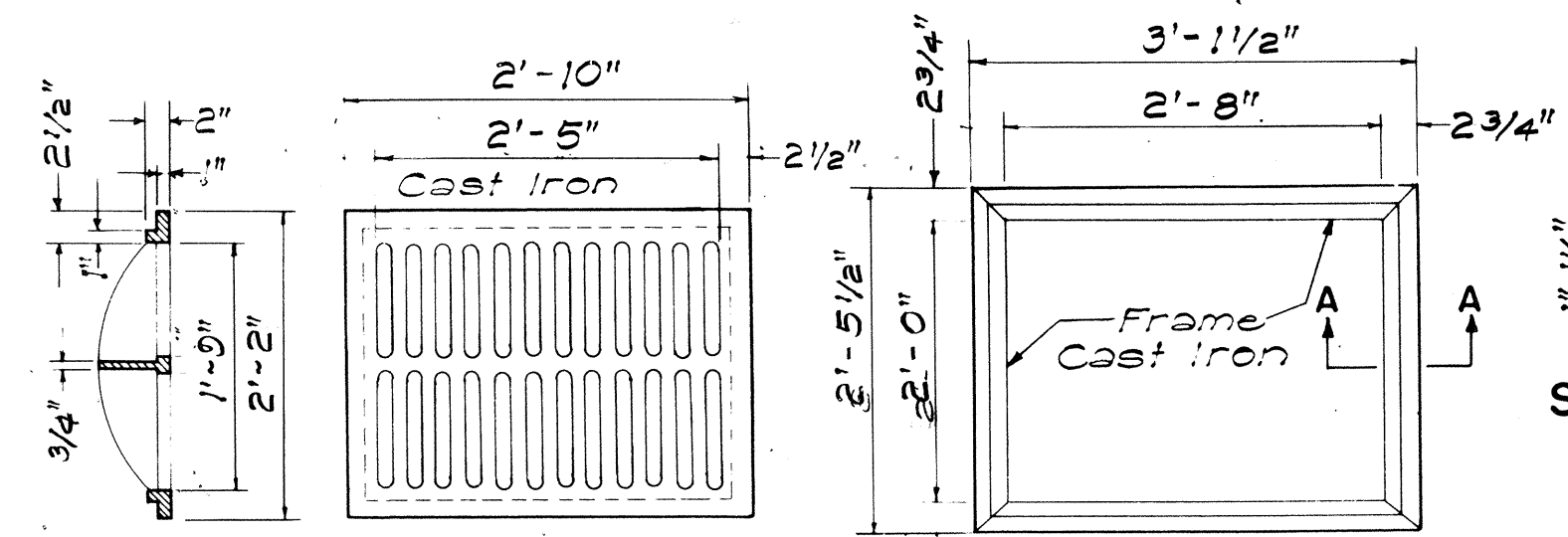
SECTION



BOTTOM VIEW OF COVER

DETAILS OF TYPE "A"
CAST IRON FRAME AND COVER

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



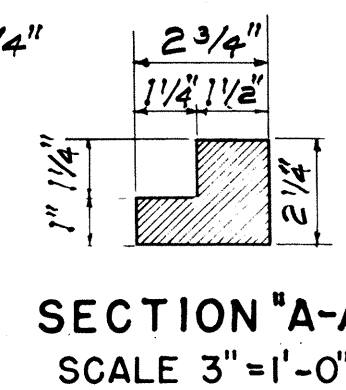
SECTION

TOP VIEW

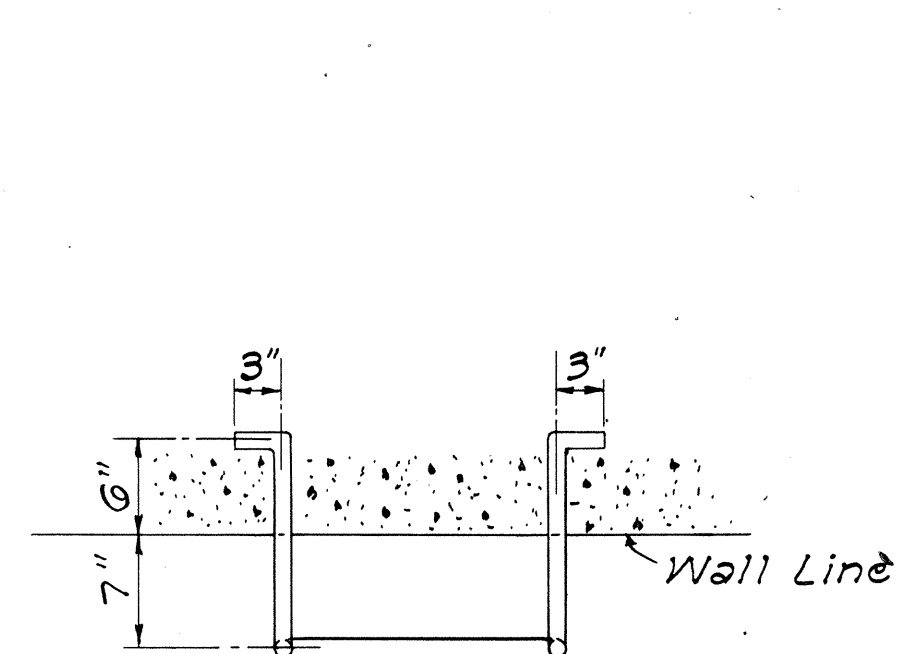
TOP VIEW

TYPE C C.I. FRAME AND GRATE

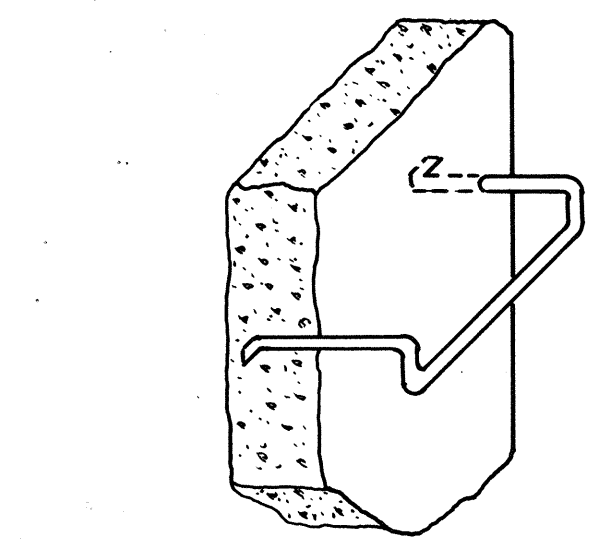
SCALE: 3/4" = 1'-0"



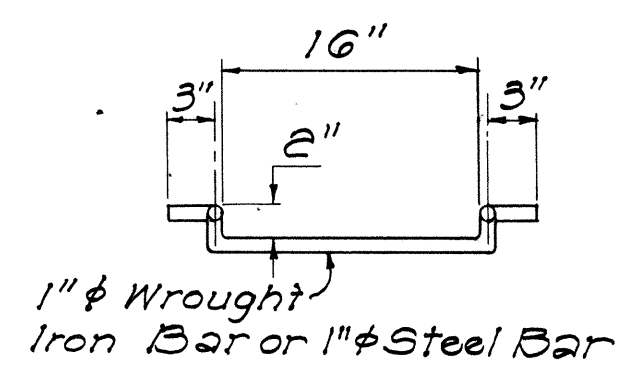
SECTION "A-A"
SCALE 3" = 1'-0"



P L A N

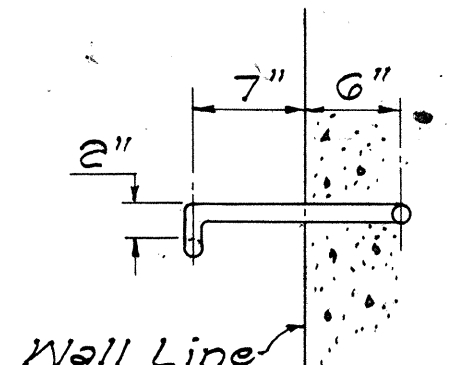


PICTORIAL VIEW
NOT TO SCALE



1" Wrought
Iron Bar or 1" Steel Bar

FRONT VIEW



Wall Line

SIDE VIEW

DETAILS OF MANHOLE RUNG

SCALE: 1" = 1'-0"

APPROVAL RECOMMENDED:		12-17-69
HYDRAULIC DESIGN ENGINEER		DATE
APPROVED:		12-17-69
ASSISTANT CHIEF, ENGINEERING		DATE

NO.	REVISION	APPROVED BY	DATE
1.	Detail of Type "P" Cast Iron Frame and Cover	H.T.	1-6-71
2.	Details of Manhole Rungs to conform to OSHA.	H.T.	1-21-75
3.	Option for Manhole Rungs	H.T.	1-18-76

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS
Scale: As Noted Date: July, 1969
SHEET No. 404 OF 414 SHEETS DH 6

SURVEY PLOTTED BY:	DATE:
DESIGNED BY:	
DRAWN BY:	
TRACED BY:	
NOTE BOOK:	
QUANTITIES BY:	
CHECKED BY:	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1-1 (60):23	1970	103	181

GENERAL NOTES

- Contractor has the option of using cast malleable iron, cast steel, welded, bolted, cast malleable iron end block or cast steel end block grate.
- Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
- All welds $\frac{3}{8}$ " unless otherwise noted.
- Center support assembly shall be used when two or more grates are specified. Incidental to Types A-9 or A-12 Frame and Grates.
- Refer to "Grate Bar Spacing Table" for Types A-9 and A-12 Grate dimensions.
- The various materials shall conform to the specifications of ASTM as listed in the following tabulation and the Std. Specifications.

Material	ASTM Designation
Structural Steel	A283, Grade D
Cast Steel	A27, Grade 65-35
Malleable Iron Casting	A47, Gr. No. 35018

GRATE BAR SPACING TABLE			
TYPE	NO. BARS	CLEAR BAR SPACING - W	X
A-9	9	2"	$1\frac{9}{16}$ "
A-12	12	$1\frac{3}{8}$ "	$1\frac{1}{4}$ "

NOTE:

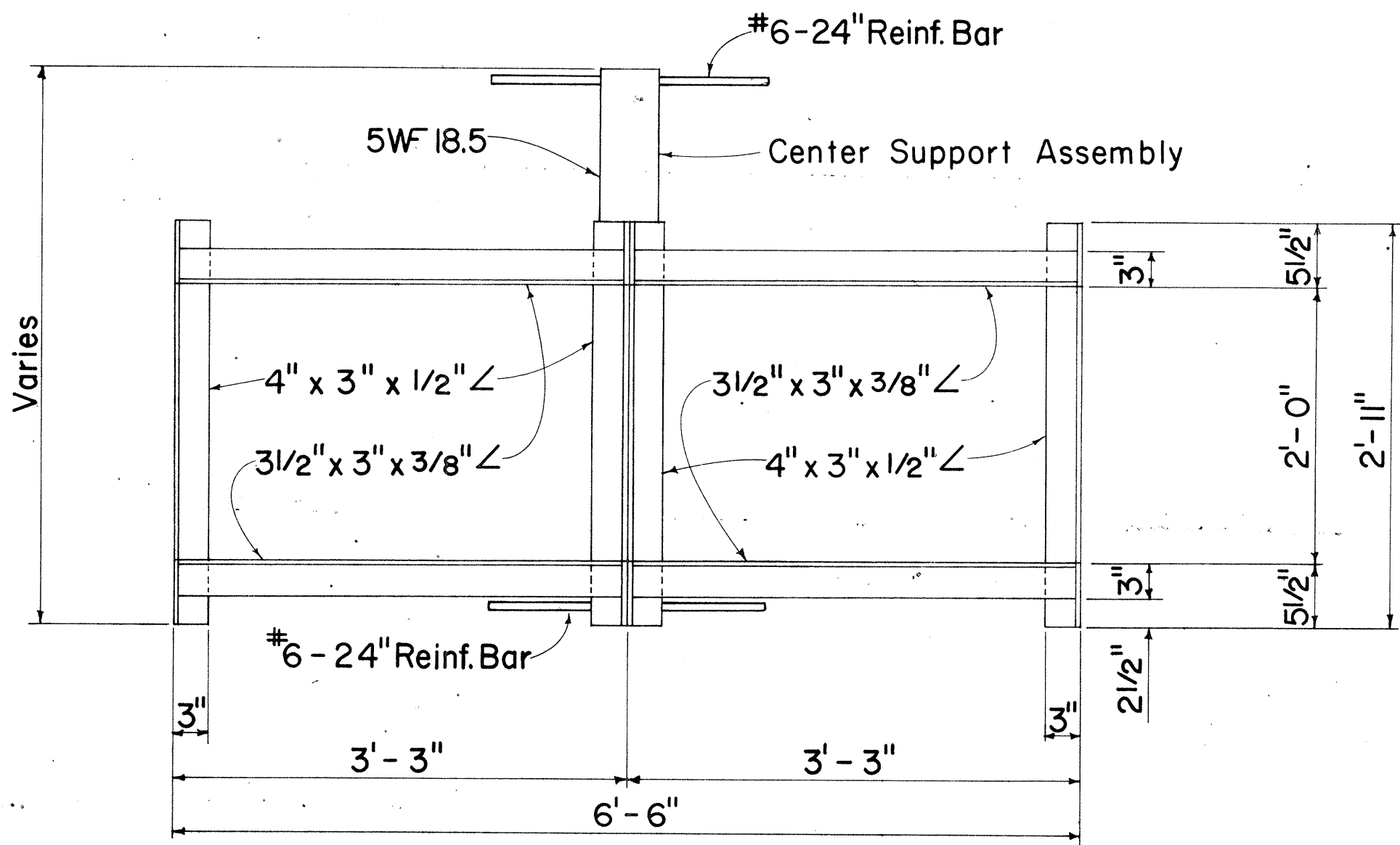
- Type A-9 - Use in locations off the roadbed on all types of highways.
- Type A-12 - Use within the roadbed on all types of highways.

APPROVAL RECOMMENDED:

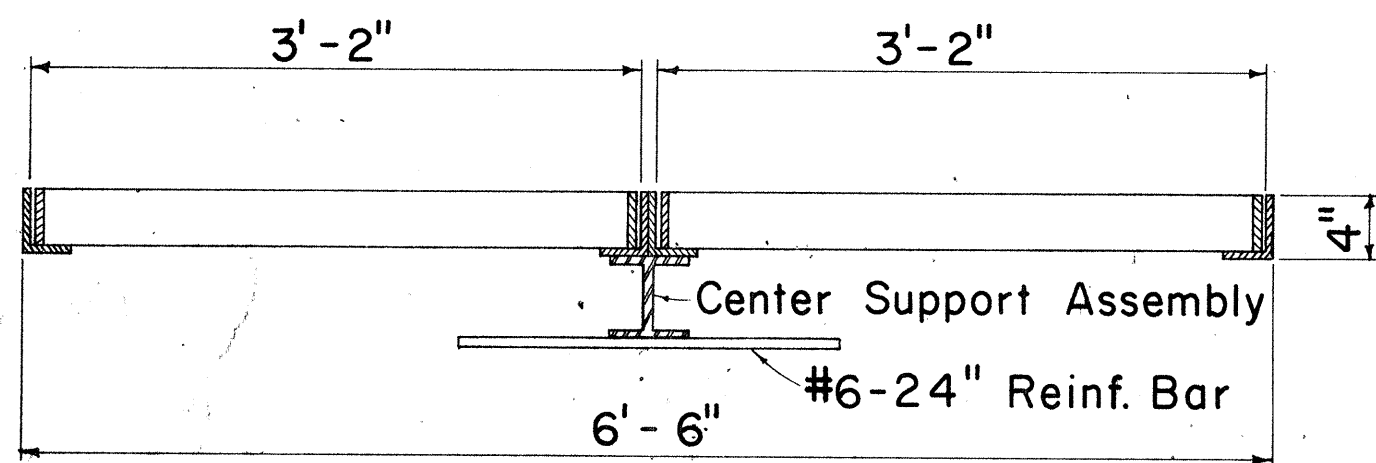
 HYDRAULIC DESIGN ENGINEER

 ASSISTANT CHIEF, ENGINEERING

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION			
STANDARD DETAILS			
TYPE A-9 AND A-12			
FRAMES AND GRATES			
Scales: As Noted		Date: Aug. 1968	
SHEET No. 41H OF 41H SHEETS			



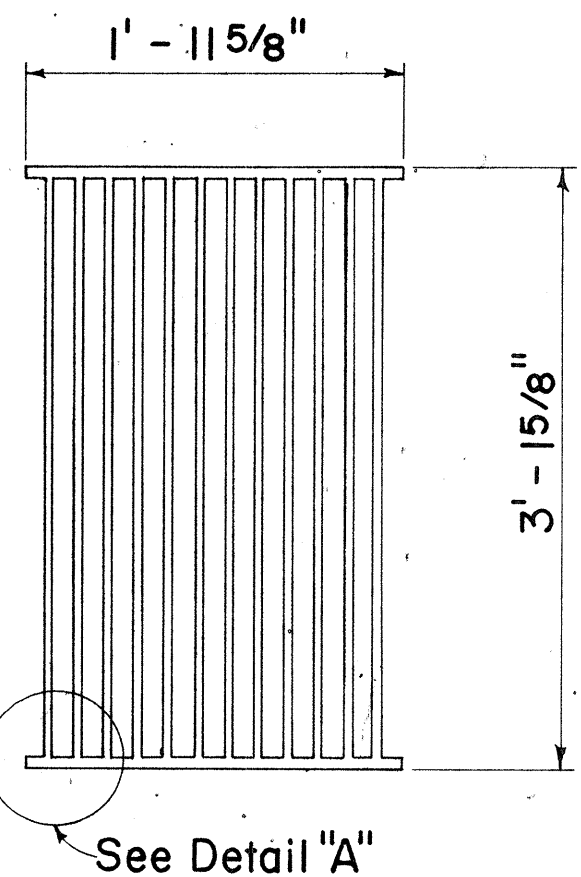
PLAN
(Two or More Grates)



LONGITUDINAL SECTION
(Thru Frame & Grate)

FRAME DETAILS

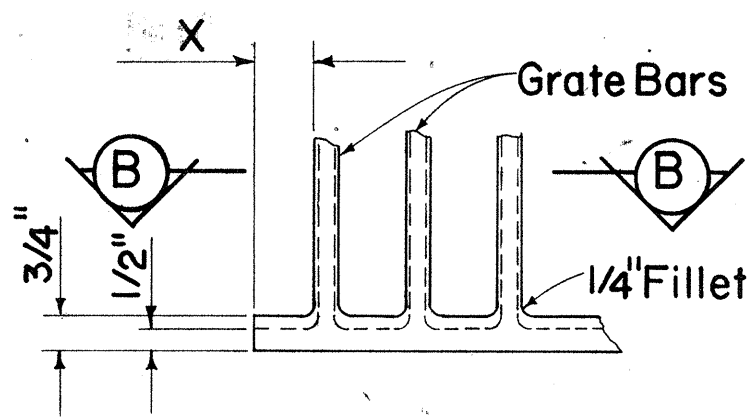
Scale: 1" = 1' - 0"



PLAN

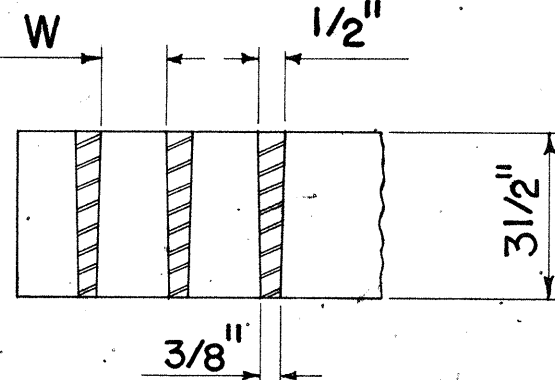
Scale: 1" = 1' - 0"

ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL GRATE



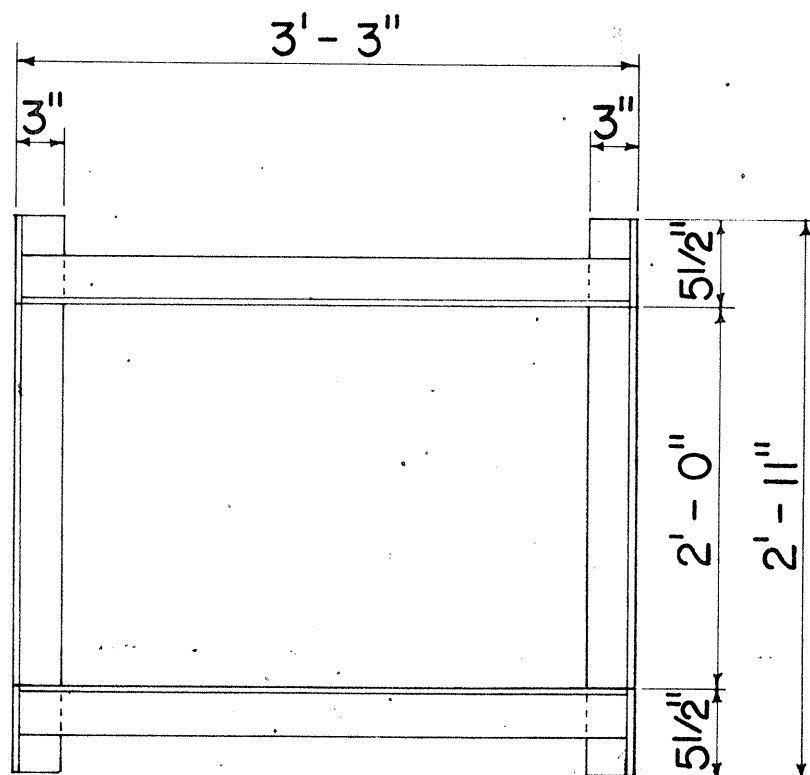
DETAIL "A"

Scale: 3" = 1' - 0"

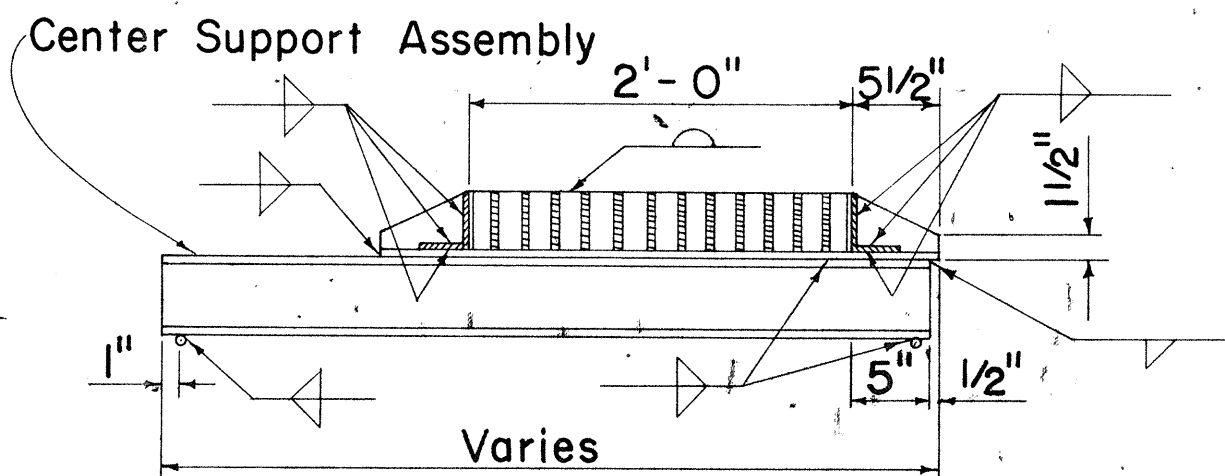


SECTION "B-B"

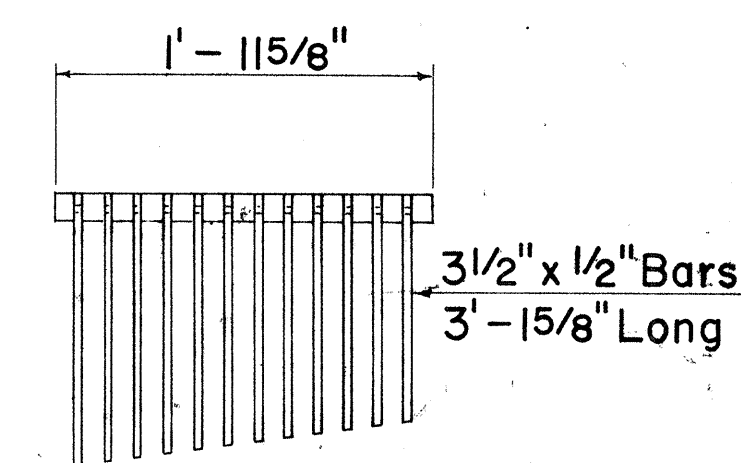
Scale: 3" = 1' - 0"



PLAN
(Single Grate)

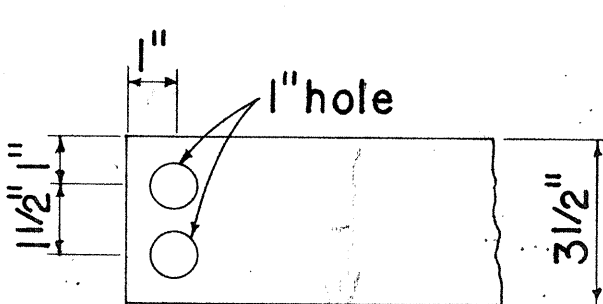


CROSS SECTION
(Thru Frame & Grate)



CAST END BLOCK

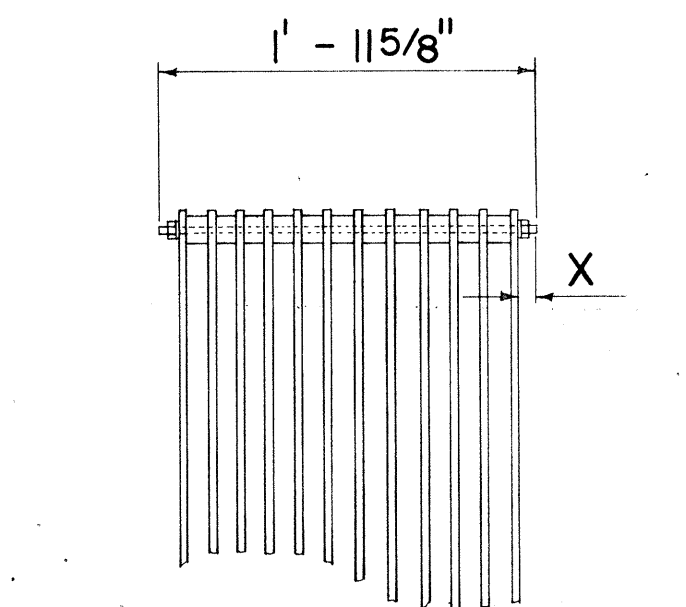
Scale: 1" = 1' - 0"



END OF BAR

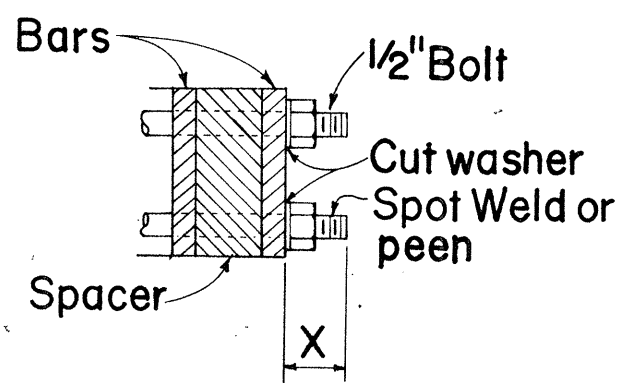
Scale: 3" = 1' - 0"

ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL END BLOCK GRATE



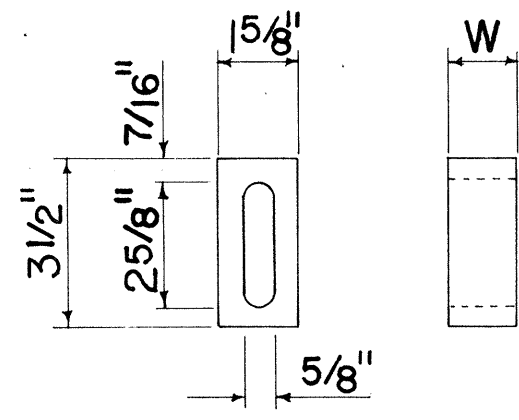
BOLTED END BLOCK

Scale: 1" = 1' - 0"



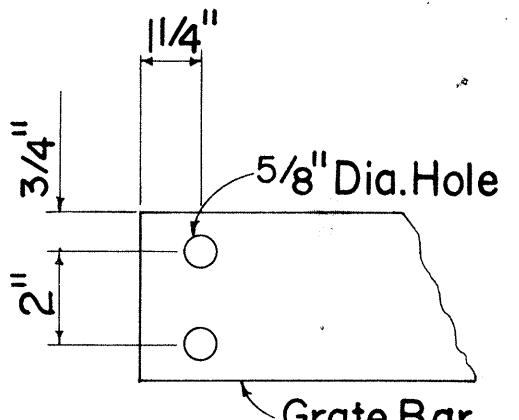
BOLTING DETAIL

Scale: 3" = 1' - 0"



BAR SPACER

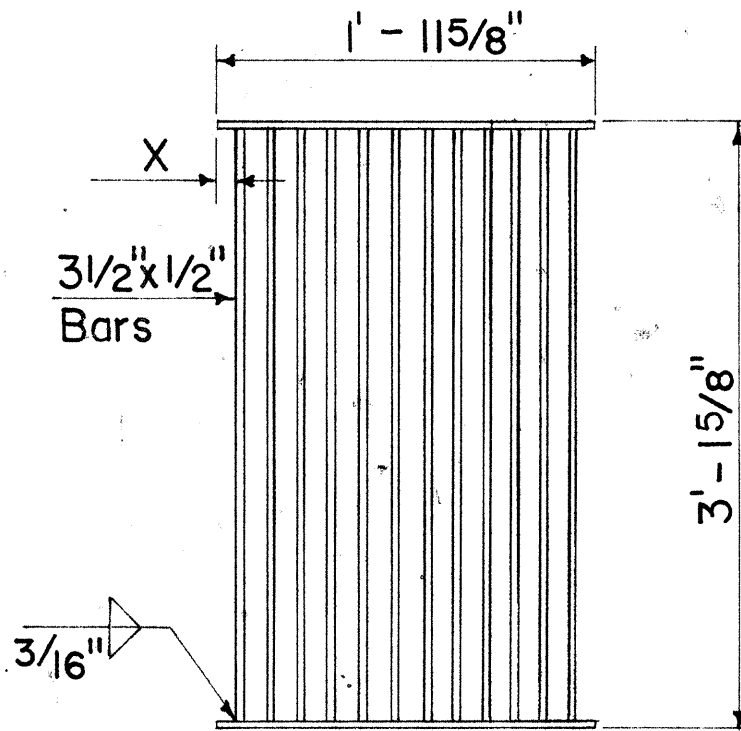
Scale: 3" = 1' - 0"



END OF BAR

Scale: 3" = 1' - 0"

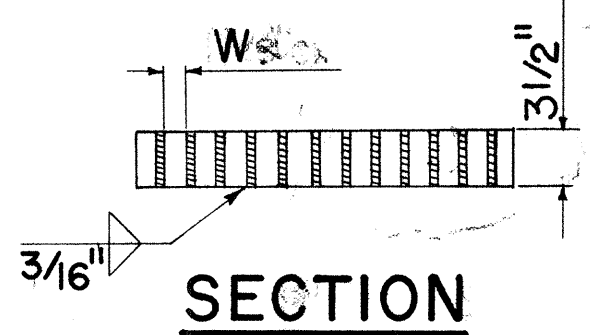
ALTERNATIVE BOLTED GRATE



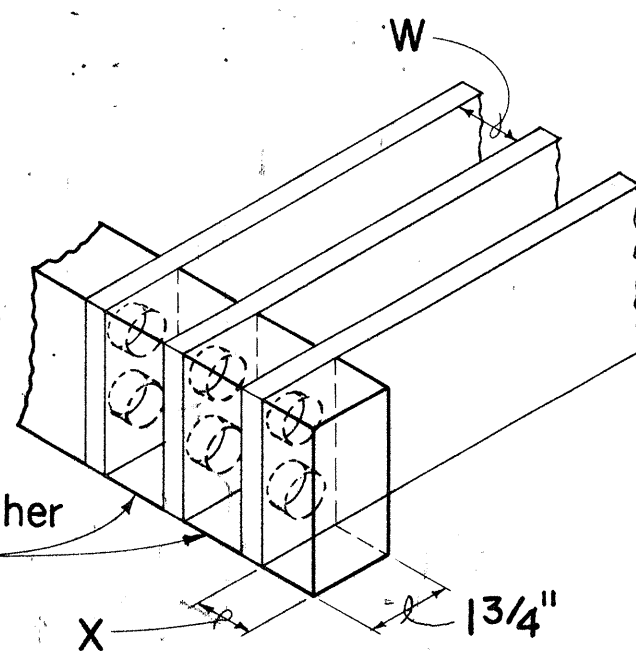
PLAN

ALTERNATIVE WELDED GRATE

Scale: 1" = 1' - 0"



SECTION



Both ends held together by solid casting

NO.	REVISION	APPROVED BY	DATE

Scale: 1" = 1' - 0"

SURVEY PLATTED BY	DATE
DRAWN BY	7/68
TRACED BY	7/68
QUANTITIES BY	7/68
CHECKED BY	7/68
ORIGINAL PLAN	
NOTE BOOK	
No.	