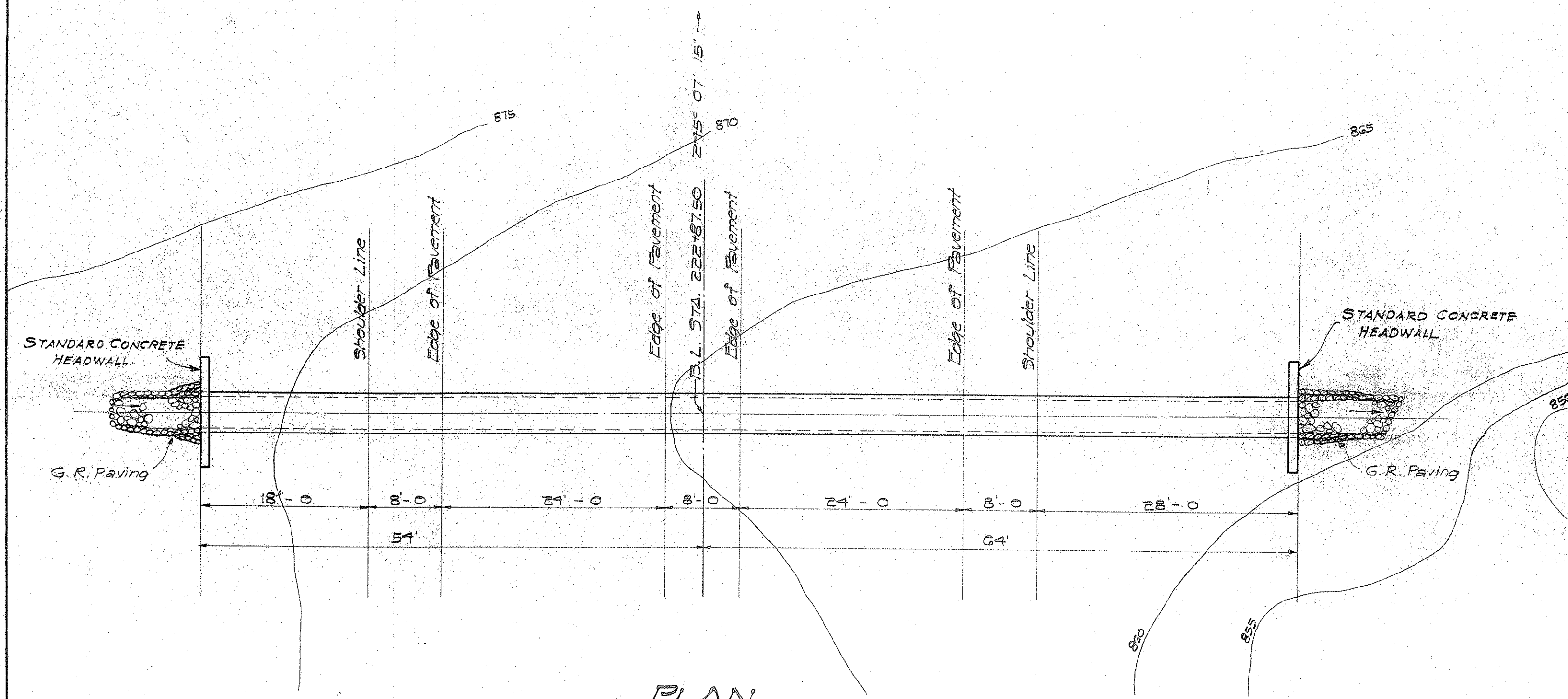
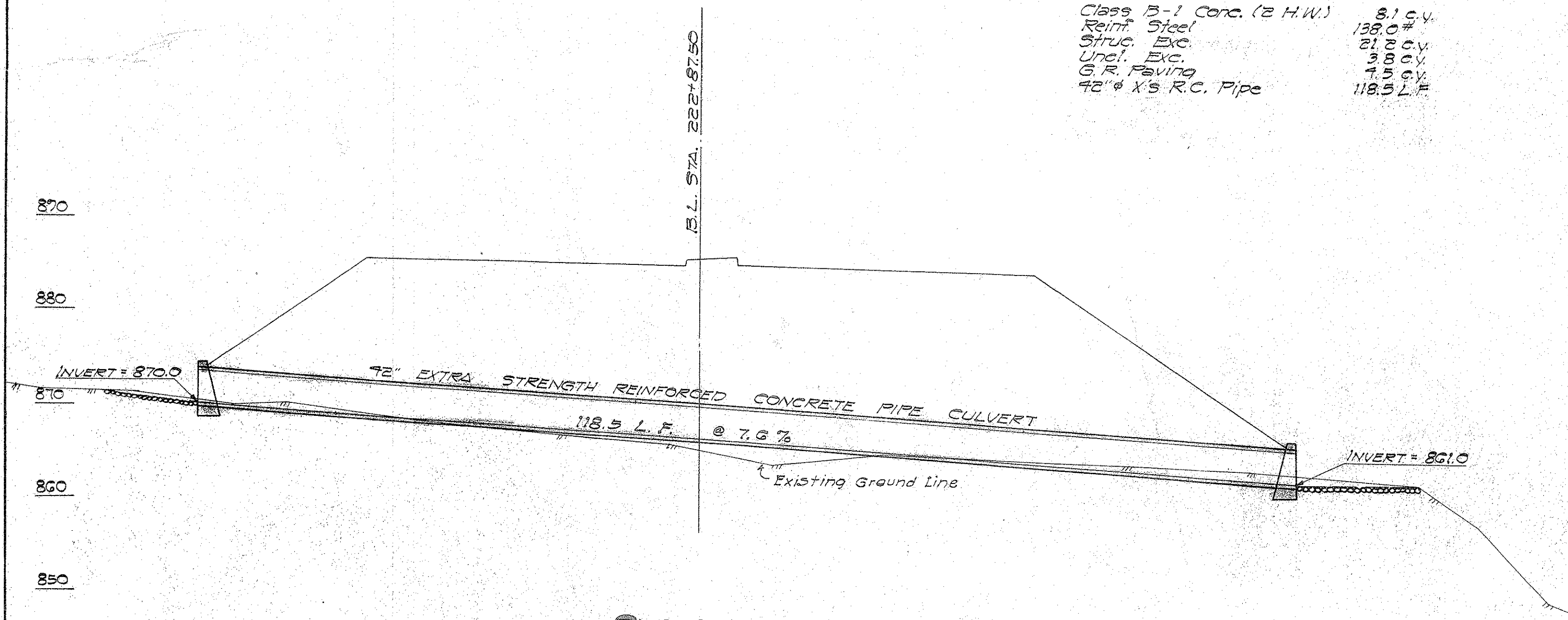




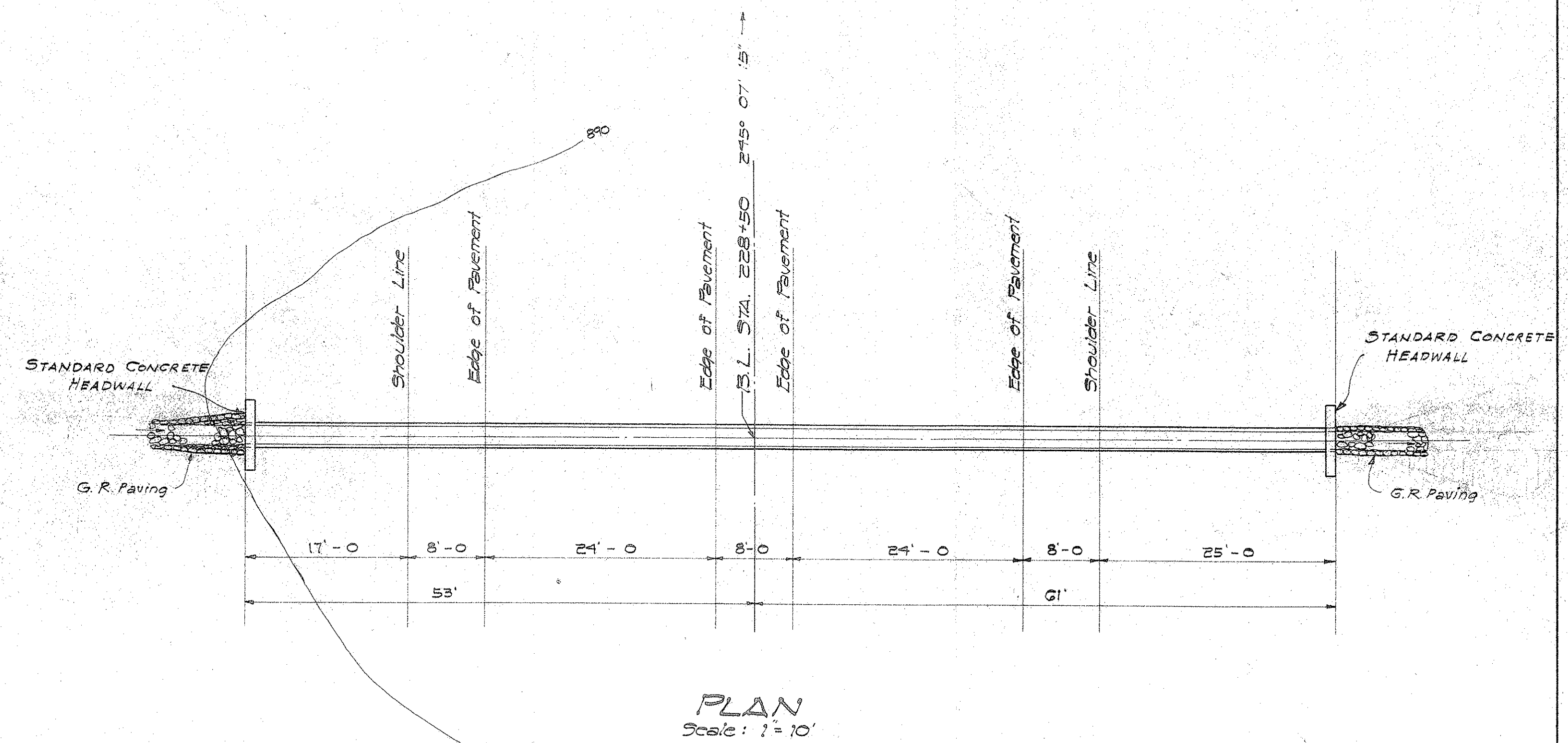
PLAN
Scale: 1" = 10'

Estimated Quantities
Class B-1 Conc. (2 H.W.) 3.1 c.y.
Reinf. Steel 138.0 #
Struc. Exc. 21.8 c.y.
Uncl. Exc. 3.8 c.y.
G.R. Paving 1.5 c.y.
42" X 8' R.C. Pipe 118.5 L.F.



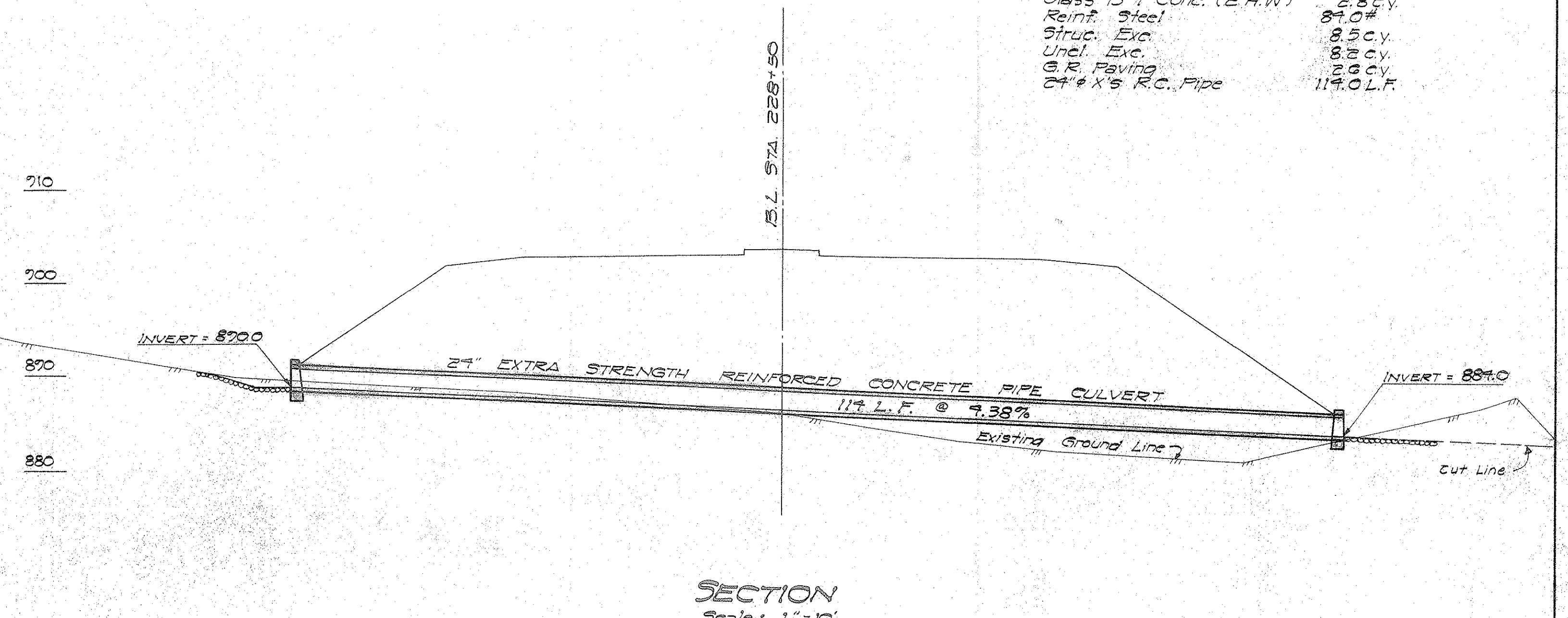
SECTION
Scale: 1" = 10'

42" R.C. CULVERT AT B.L. STA. 222+87.50



PLAN
Scale: 1" = 10'

Estimated Quantities
Class B-1 Conc. (2 H.W.) 2.8 c.y.
Reinf. Steel 84.0 #
Struc. Exc. 8.5 c.y.
Uncl. Exc. 8.8 c.y.
G.R. Paving 2.6 c.y.
24" X 8' R.C. Pipe 114.0 L.F.



SECTION
Scale: 1" = 10'

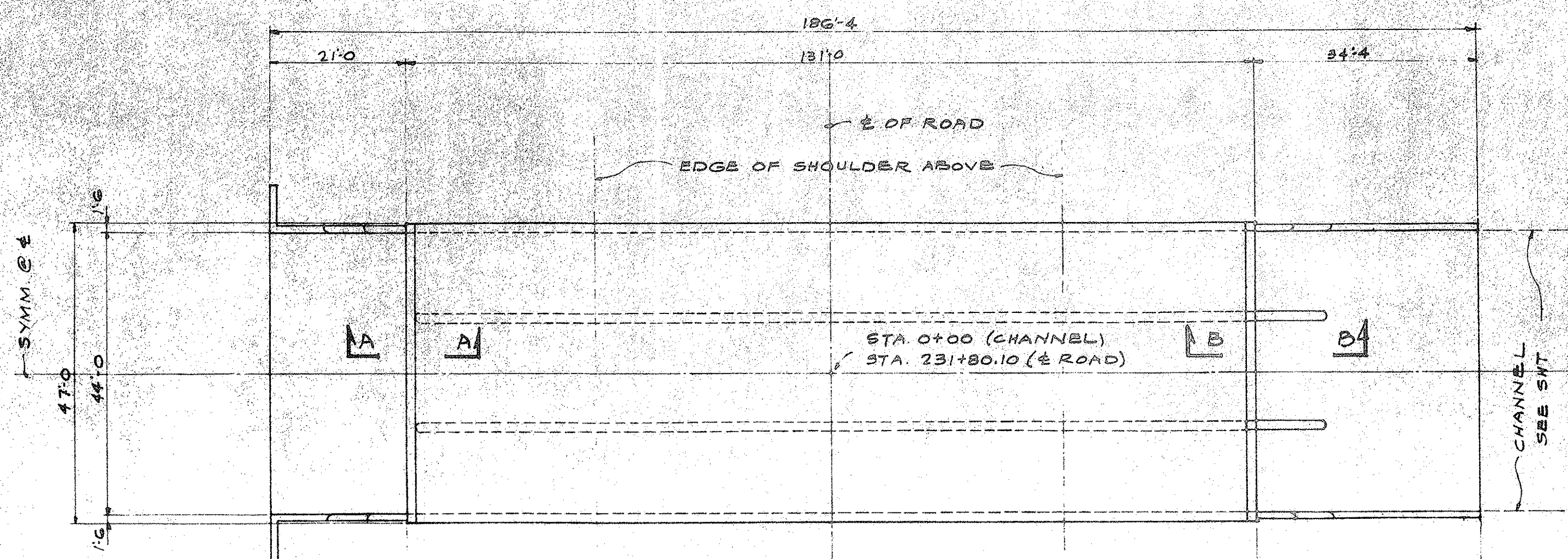
24" R.C. CULVERT AT B.L. STA. 228+50

DEPARTMENT OF PUBLIC WORKS CITY AND COUNTY OF HONOLULU			
BUREAU OF PLANS			
KALIHI TUNNEL			
CULVERT DETAILS			
B.L. STA. 222+87.50 & 228+50			
ENGINEER S.O.H.	DATE July 15, 1953		
DRAFTSMAN J.N.S.	CHECKED BY S.O.H.-R.W.		
SCALE As Shown	TRACER J.N.S.		
APPROVED <i>[Signature]</i>	APPROVED <i>[Signature]</i>		
CHIEF ENGINEER	BUREAU ENGINEER		
W. S.	PROFILE	C. B.	
CR. SEC.	F. B.	S. B.	
W. M. BY.	P. W. BY.	S. BY.	

SECTION C JOB NO. 26-53 DWG. R-9

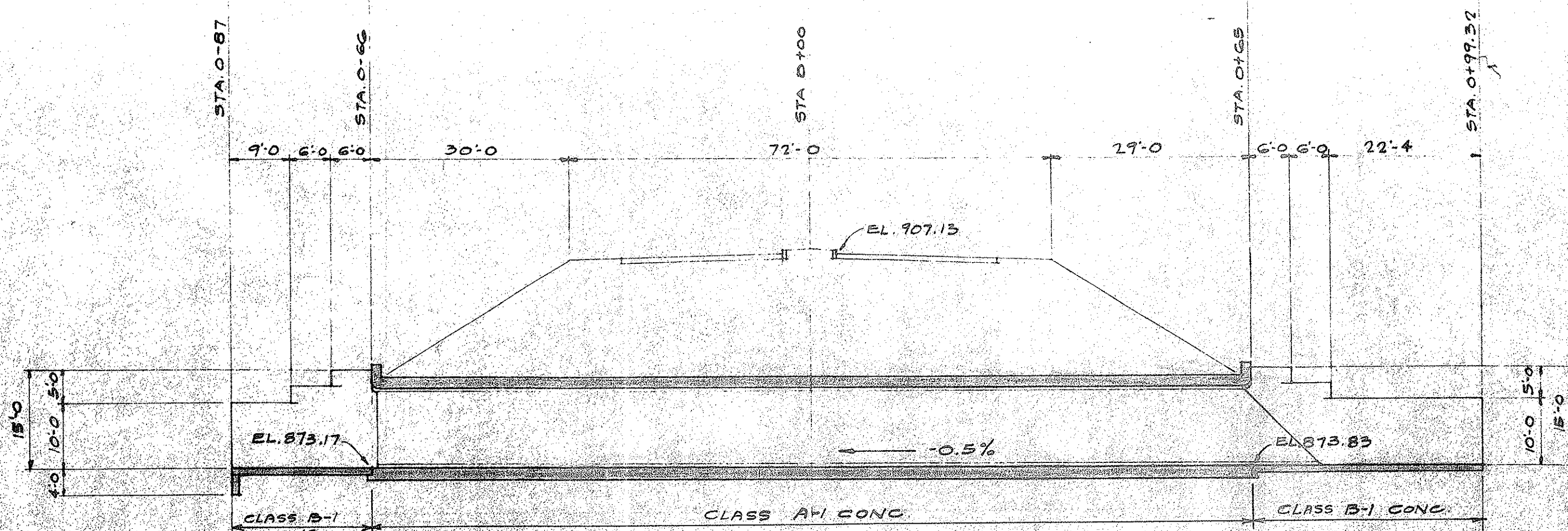
Sheet No. 18 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	1	18



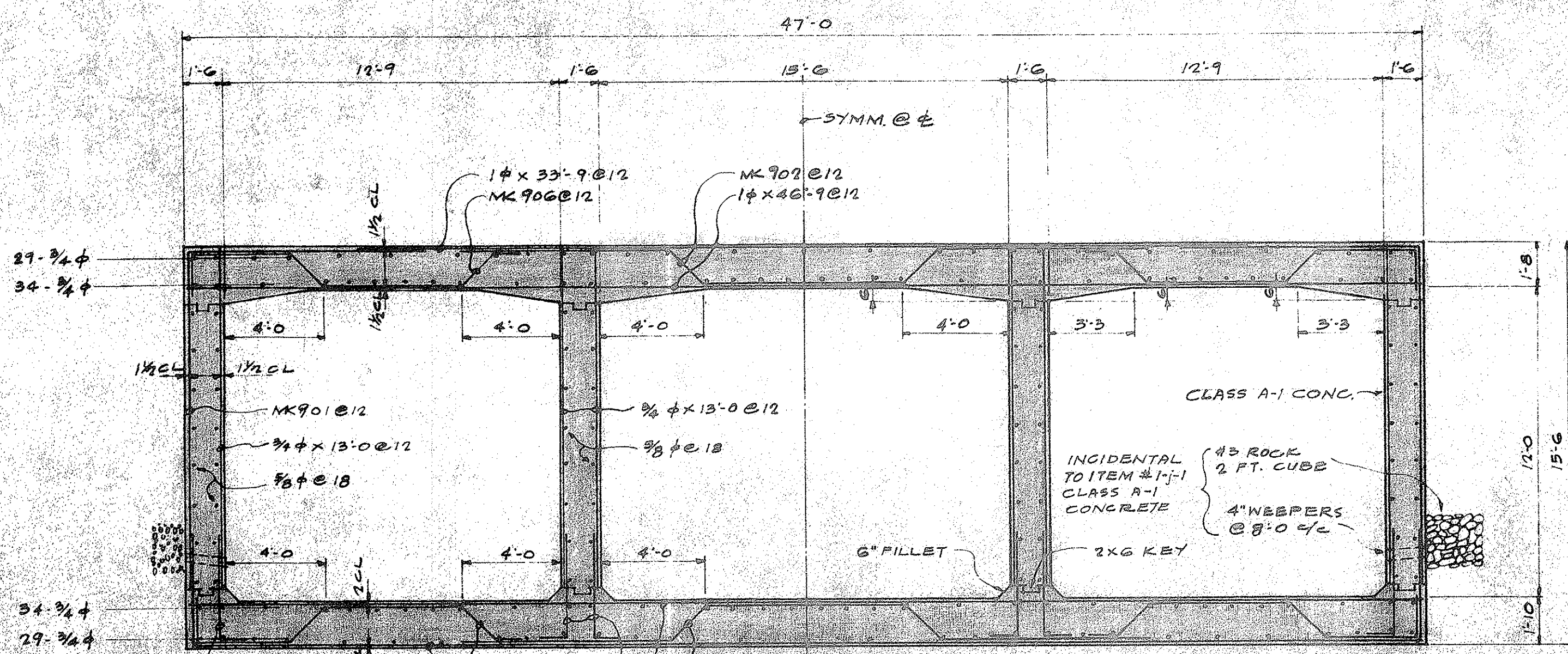
PLAN

1/8" = 1'-0"



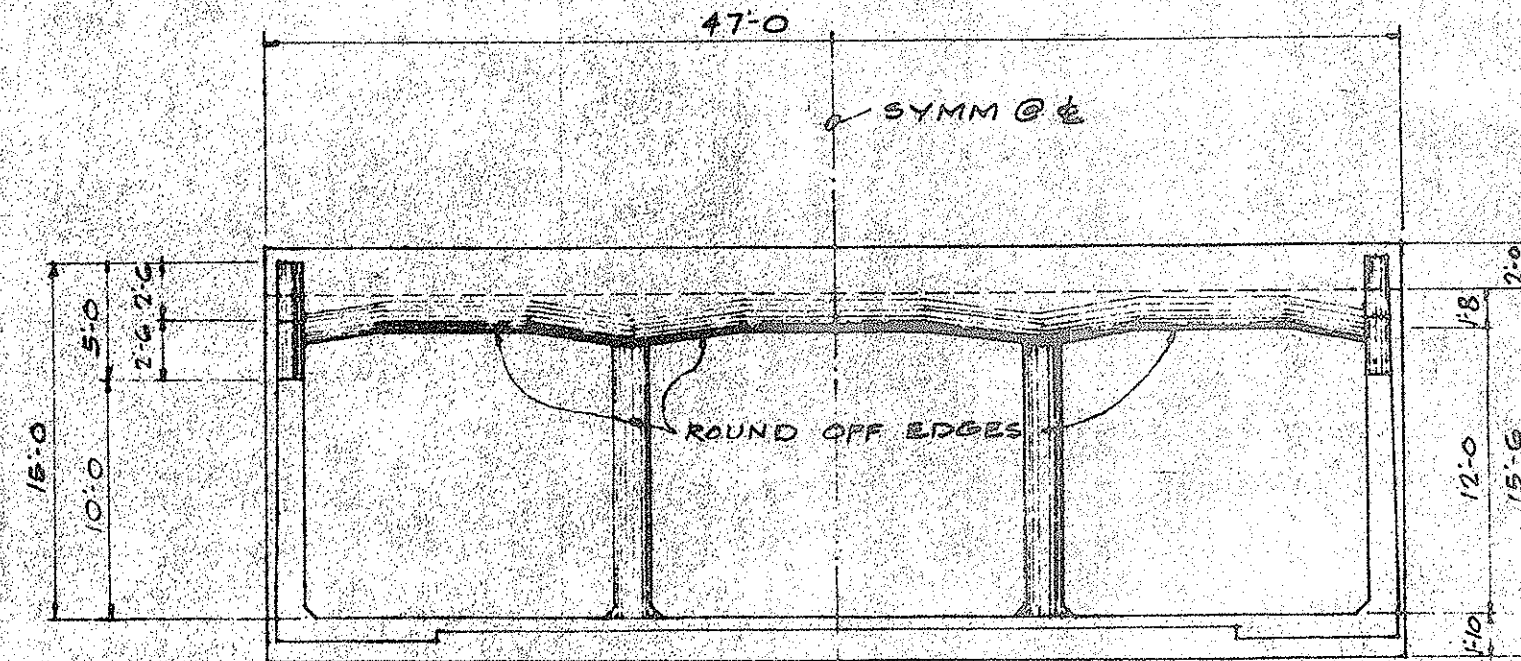
LONGITUDINAL SECTION

1/8" = 1'-0"



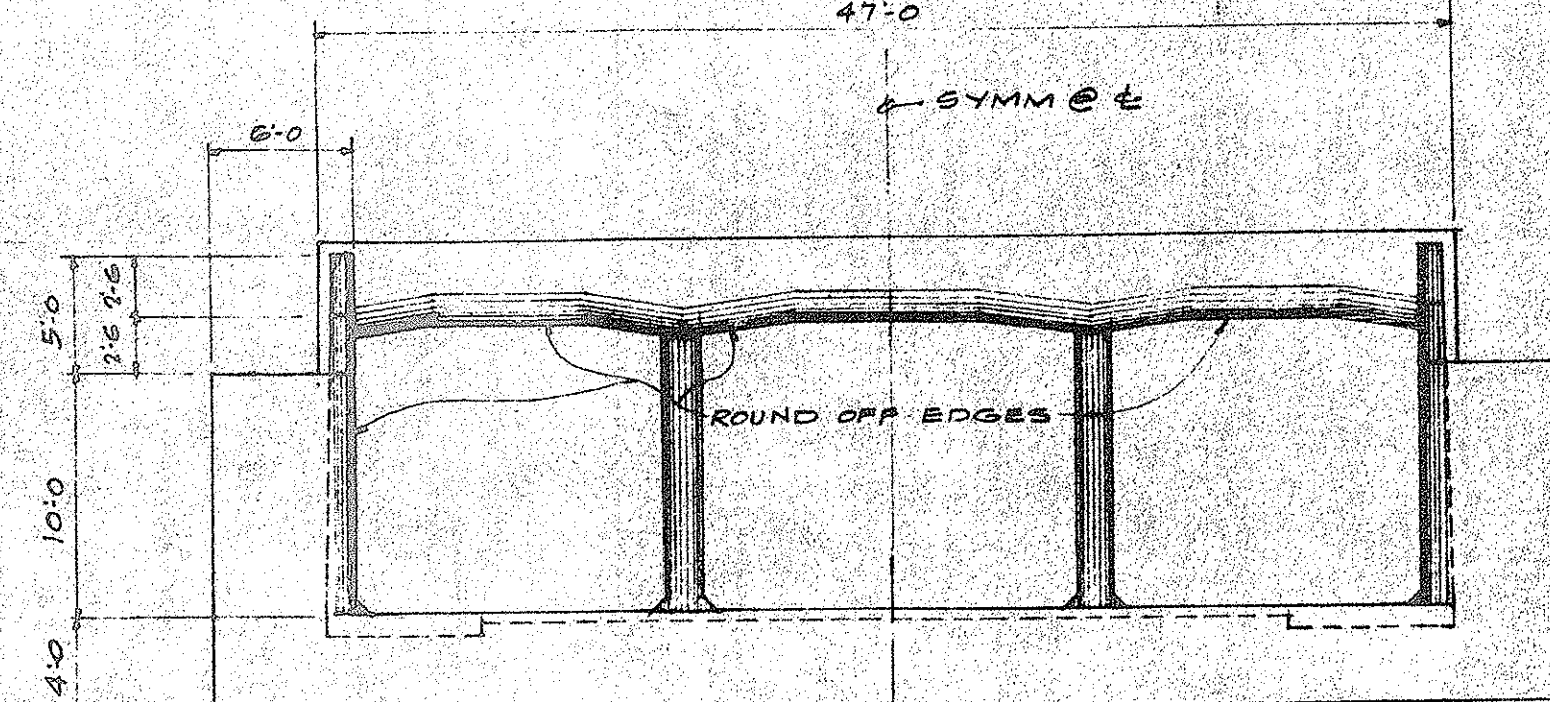
TYPICAL CROSS SECTION

1/4" = 1'-0"



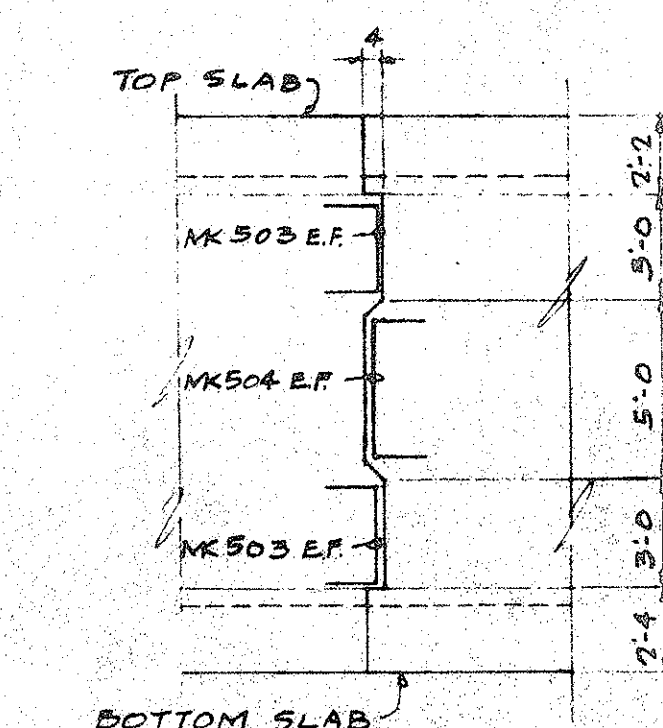
UPSTREAM ELEVATION

1/8" = 1'-0"

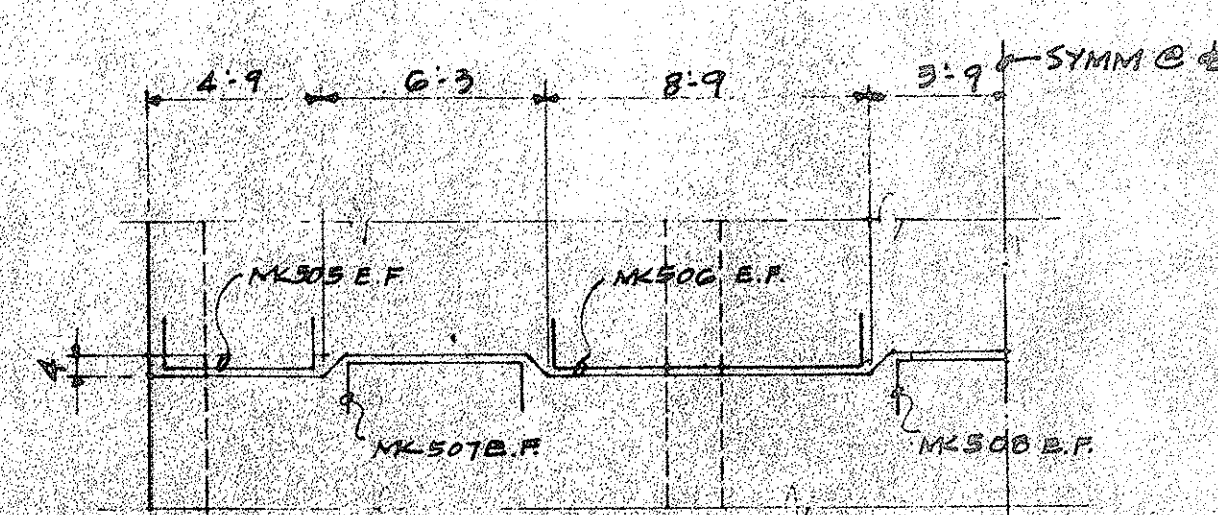


DOWN STREAM ELEVATION

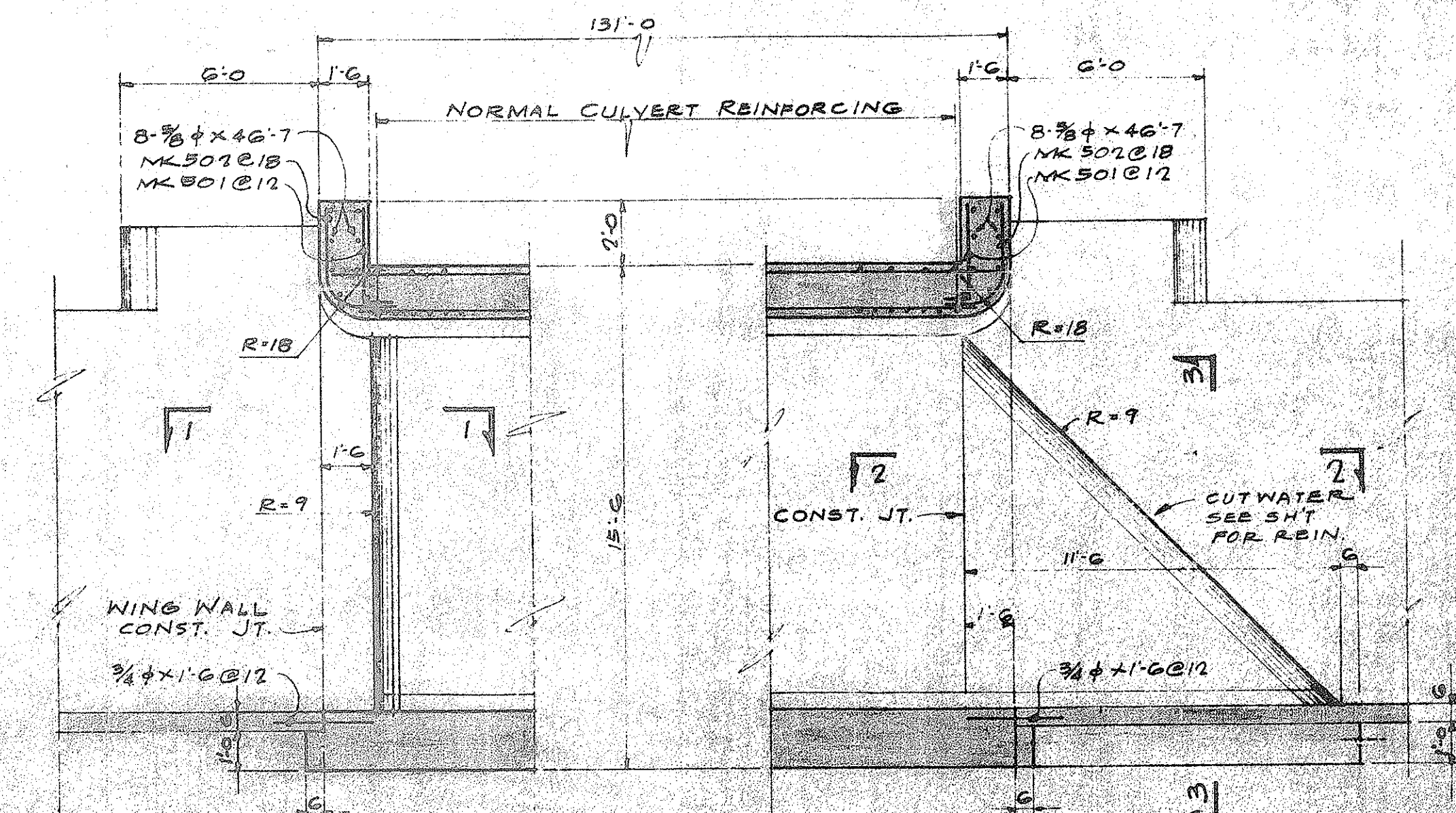
1/8" = 1'-0"



WALL CONST. JT. DETAIL



SLAB CONST. JT. DETAIL



SECTION-A

1/4" = 1'-0"

SECTION-B

STRUCTURAL DESIGN DATA:

WEIGHT OF EARTH 120#/CU. FT.
EQUIVALENT FLUID PRESSURE - 30#/FT.
LIVE LOAD - NEGLIGIBLE

$f'_c = 3,000$ PSI @ 28 DAYS
 $f'_c = 1,000$ PSI
 $v = 90$ PSI
 $u_L = 180$ PSI
 $f_s = 20,000$ PSI

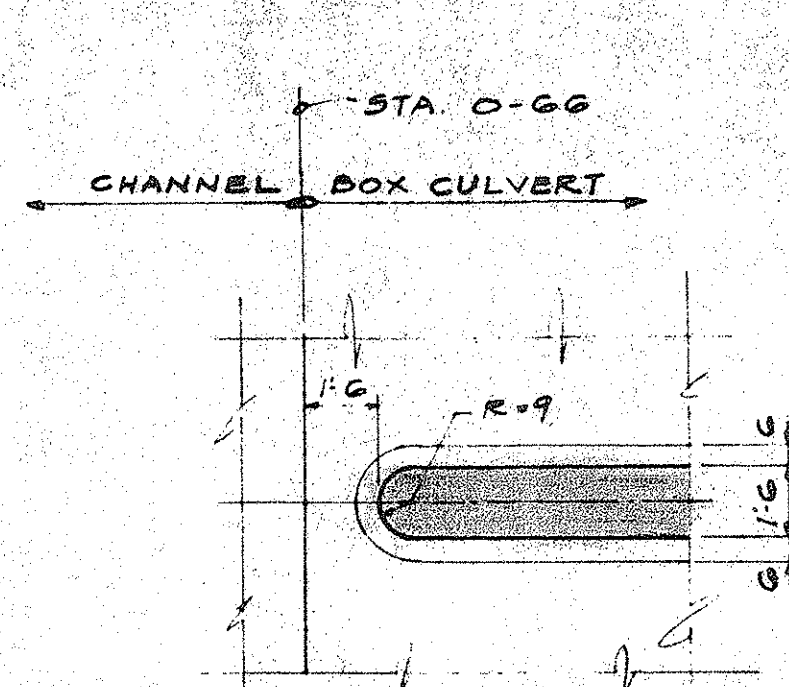
ALLOWABLE UNIT STRESSES INCREASED 15% (OHIO STATE '51)

HYDRAULIC DATA

DRAINAGE AREA - 361 ACRES
DESIGN DISCHARGE - 4,330 CFS

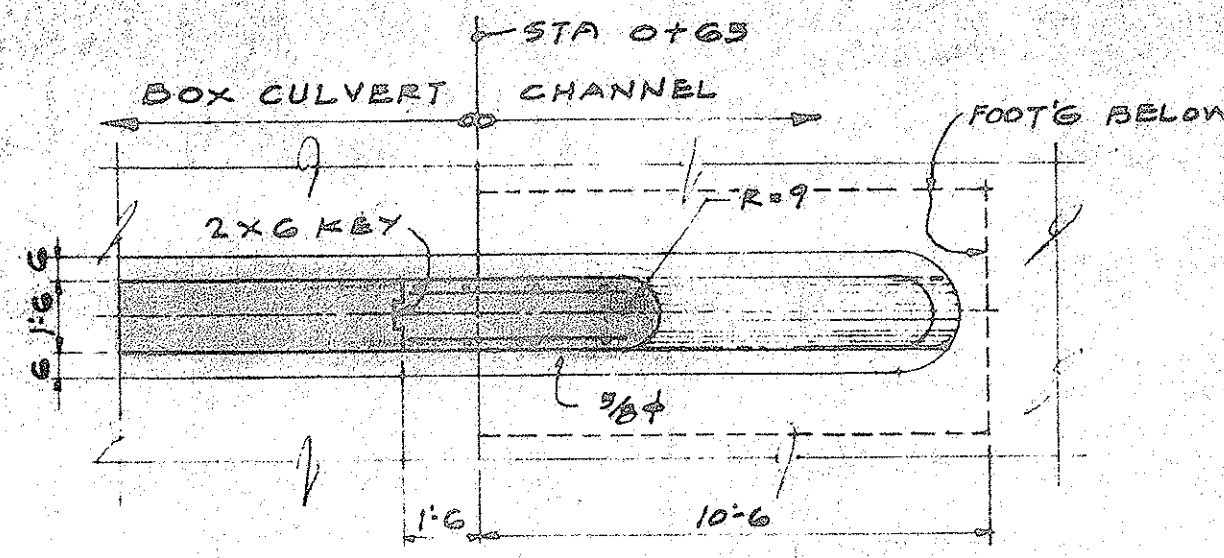
NOTES:

1. ALL REINFORCING BARS TO BE NEW BILLET INTERMEDIATE GRADE DEFORMED BARS.
2. WORK THIS SHEET WITH DWG. NO. R-11.



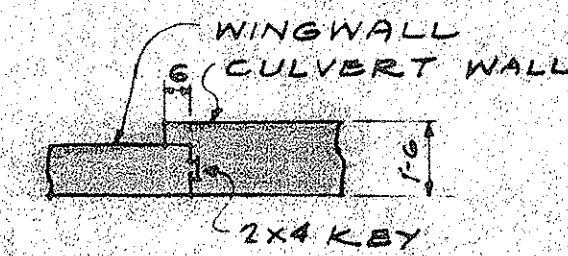
SECTION-1

1/4" = 1'-0"



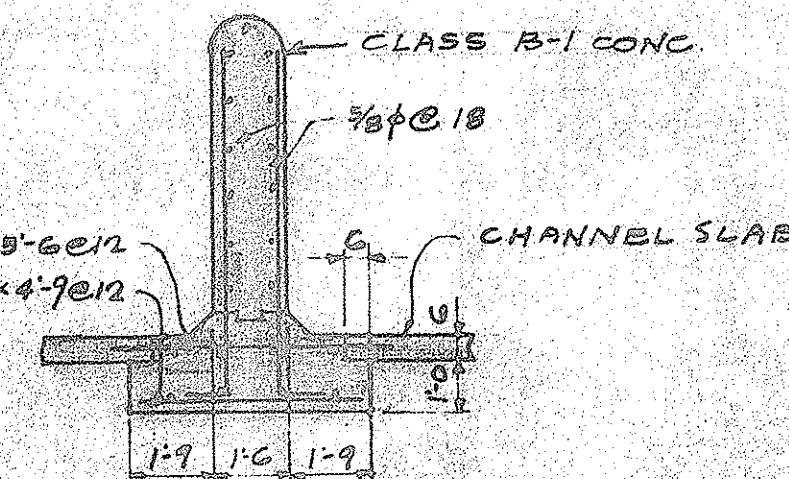
SECTION-2

1/4" = 1'-0"



DETAIL OF WINGWALL AT CULVERT

1/4" = 1'-0"



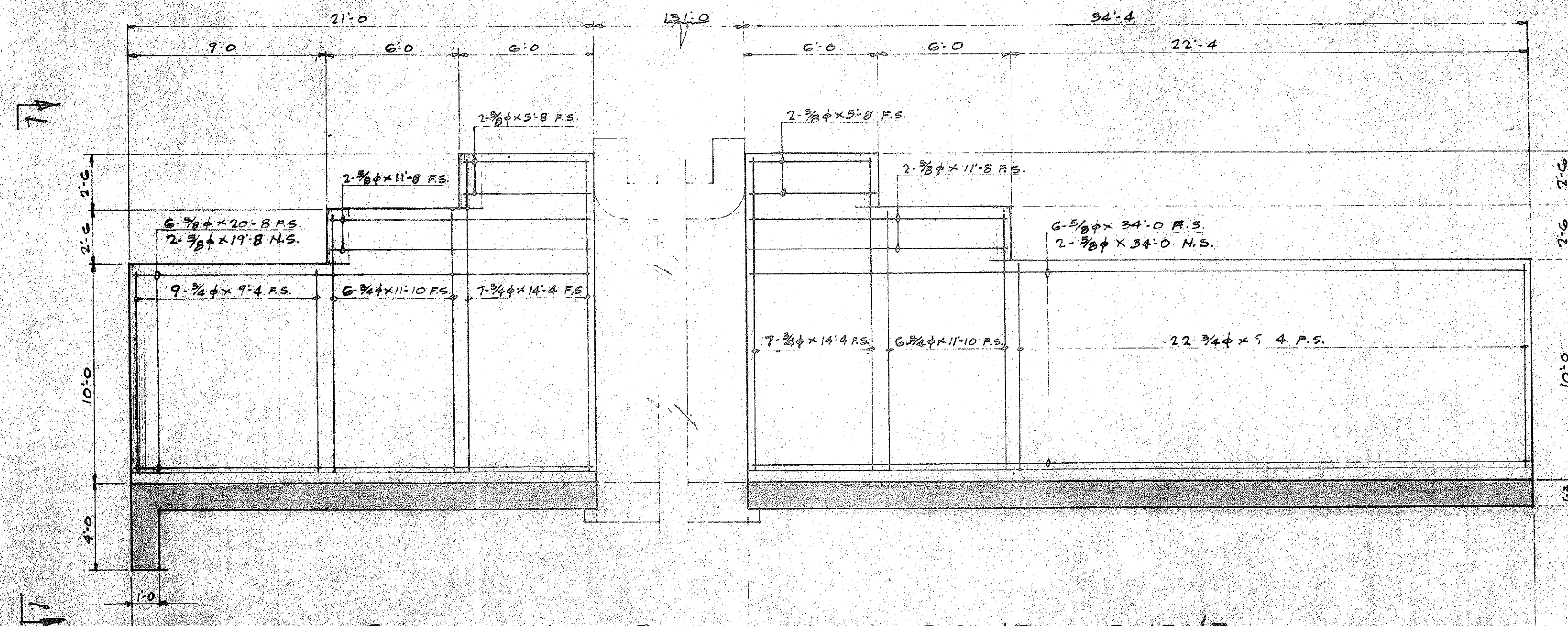
SECTION-3

1/4" = 1'-0"

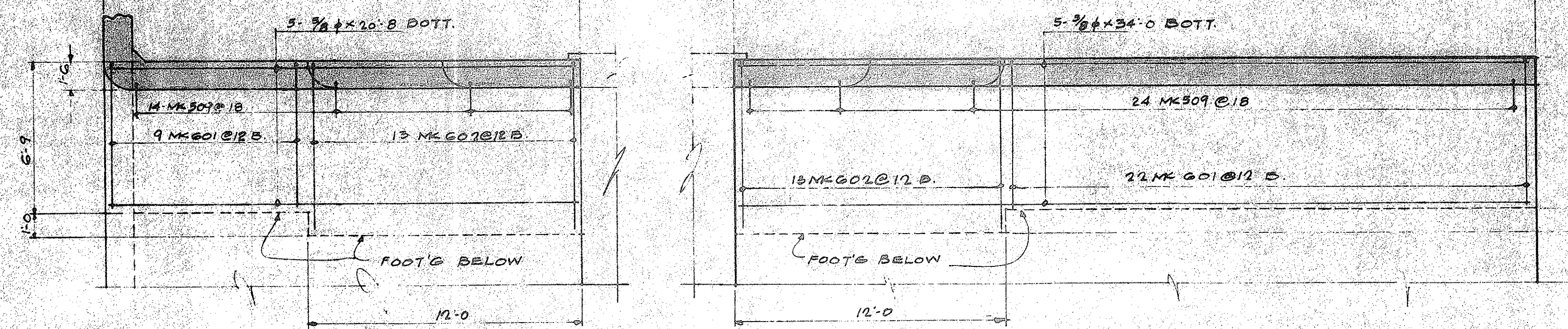
APPROVED
ENGINEER, KALIHI TUNNEL

SECTION C

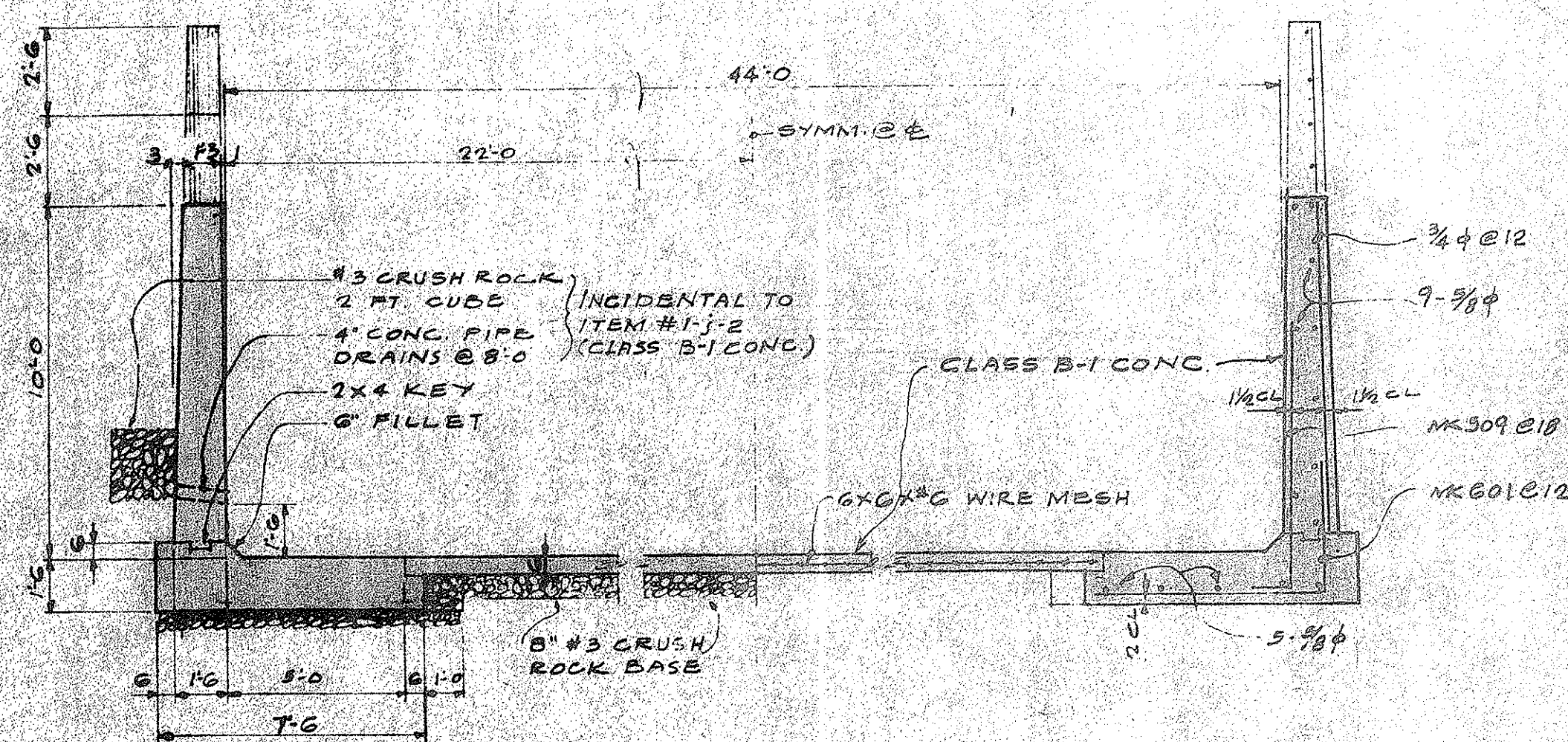
DEPARTMENT OF PUBLIC WORKS CITY AND COUNTY OF HONOLULU BUREAU OF PLANS			
KALIHI TUNNEL KALIHI APPROACH ROAD 3-CELL R.C. BOX CULVERT AT B.L. STA. 231+80.10			
ENGINEER J.R.O.	CHECKED BY J.R.O.	DATE JULY 15, 1953	TRACER J.R.O.
DRAFTSMAN J.R.O.	SCALE AS SHOWN	APPROVED J.W. Buttrill	APPROVED J.W. Buttrill
CHIEF ENGINEER		BUREAU ENGINEER	
W.B. BY J.R.O.	PROFILE F.B.	C.B. BY J.R.O.	S.B. BY J.R.O.
JOB NO. 26-53		DWG. R-10	



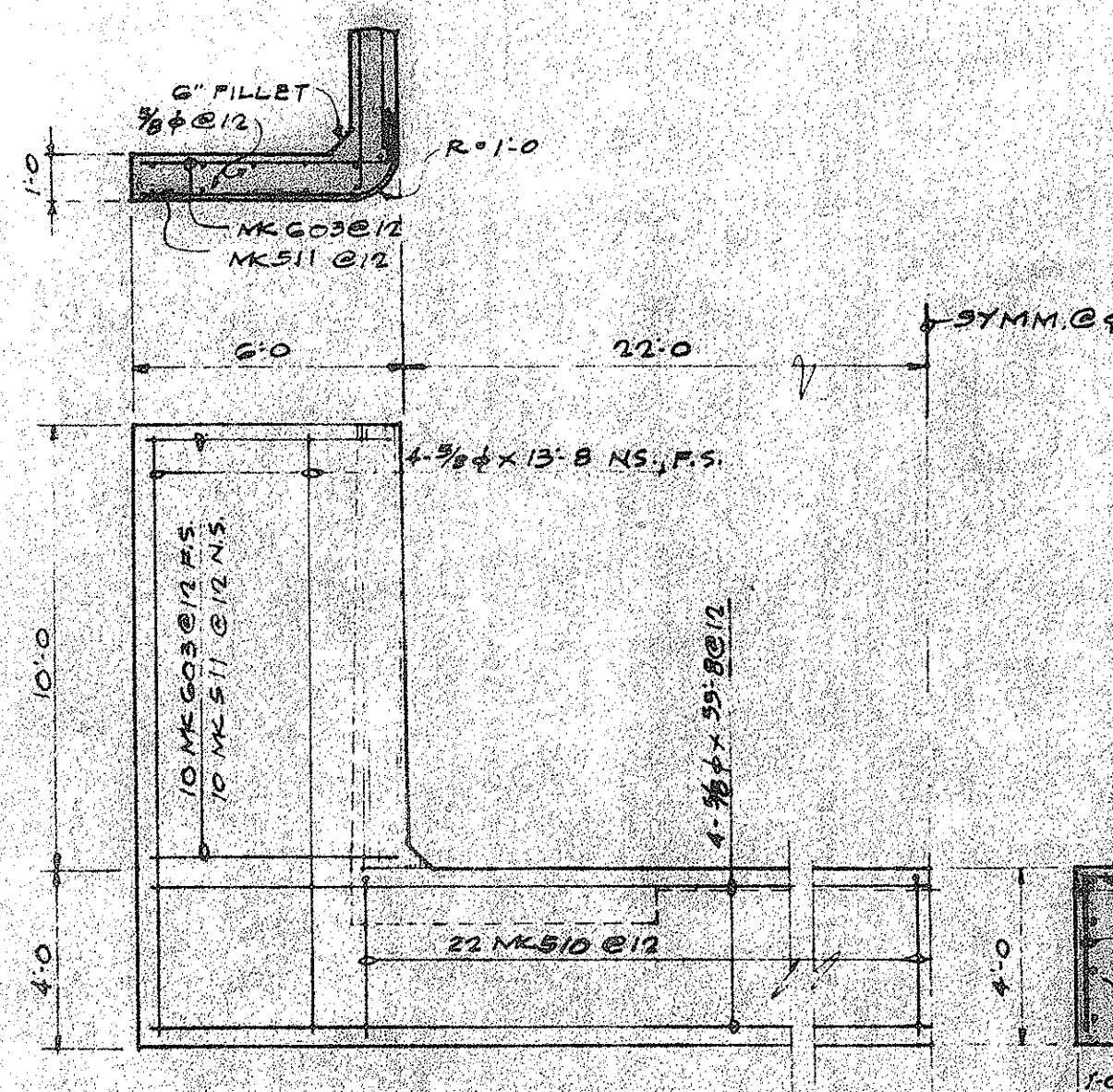
CHANNEL WALL ELEVATION AND REINFORCEMENT



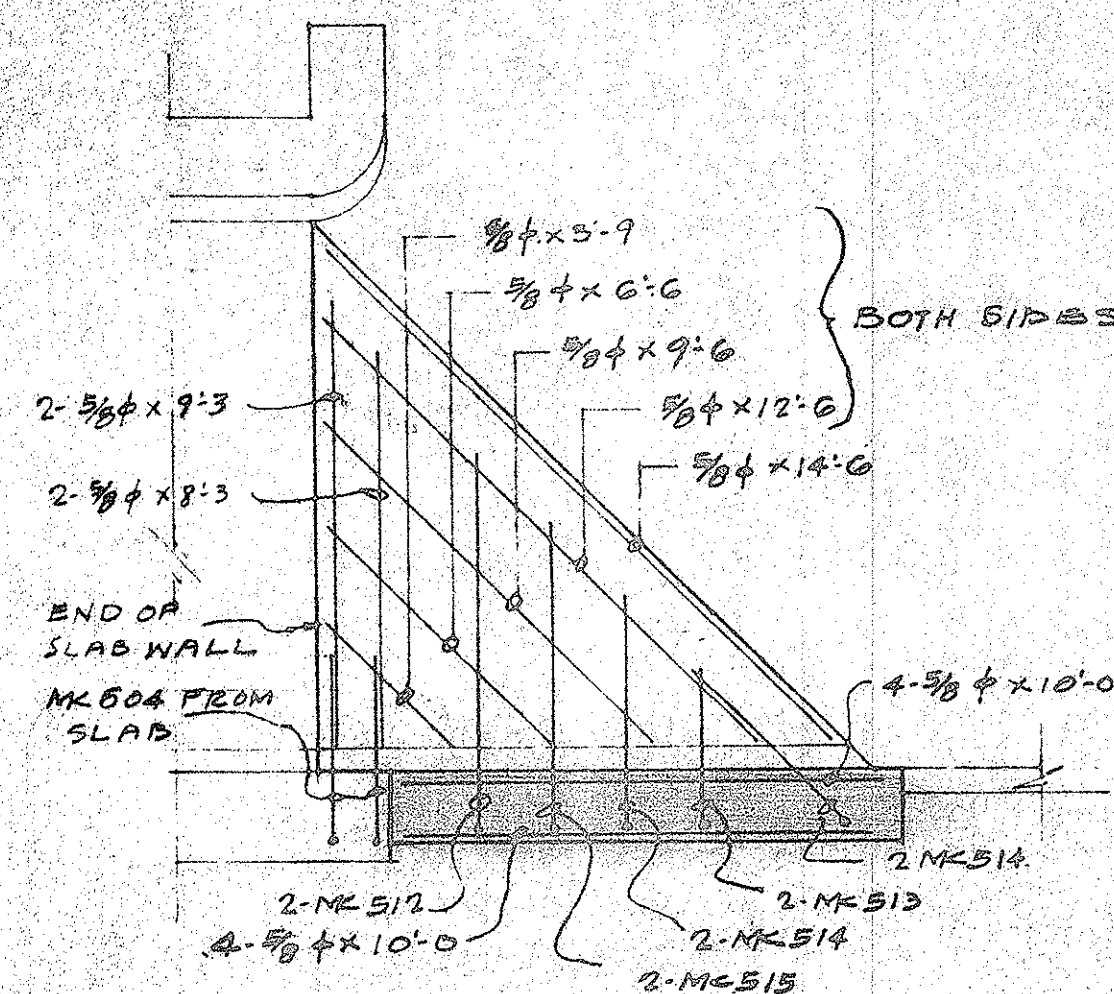
CHANNEL FOOTING PLAN AND REINFORCEMENT



TYPICAL CHANNEL SECTION



SECTION-1
1'-0"



CUTWATER REINFORCING

ESTIMATED QUANTITIES

TOTAL STEEL REQ'D.	188,204 Pounds
" CLASS A-1 CONCRETE REQ'D.	1,172.7 Cu. Yds.
" CLASS B-1 CONCRETE REQ'D.	162.2 Cu. Yds.
" EXCAVATION FOR STRUCTURE	2,240 Cu. Yds.
" 6"x6"x42" WIRE MESH REQ'D.	874 Pounds

Note: Work this Sheet with Dwg. No. R-10

REINFORCING BAR SCHEDULE

BENDING DIAGRAM ALL DIMS. OUT TO OUT	MARK	NO.	SIZE	LENGTH	REMARKS	LBS.	C.Y.
3'-10"	903	204	1#	14'-0"			
4'-9"	904	132	1#	34'-9"			
4'-9"	905	132	1#	27'-9"			
4'-9"	906	132	1#	46'-9"			
4'-9"	907	132	1#	50'-0"			
4'-9"	908	132	1#	14'-0"			
4'-9"	909	132	1#	22'-9"			
4'-9"	910	132	1#	13'-0"			
4'-9"	911	132	1#	40'-0"			
4'-9"	912	132	1#	11'-0"			
4'-9"	913	132	1#	14'-0"			
4'-9"	914	132	1#	27'-8"			
4'-9"	915	132	1#	33'-9"			
4'-9"	916	132	1#	46'-9"			
4'-9"	917	132	1#	40'-0"			
4'-9"	918	132	1#	14'-0"			
4'-9"	919	132	1#	4'-4"			
4'-9"	920	132	1#	4'-3"			
4'-9"	921	132	1#	46'-7"			
4'-9"	922	132	1#	1'-6"			
4'-9"	923	132	1#	3'-8"			
4'-9"	924	132	1#	5'-5"			
4'-9"	925	132	1#	9'-5"			
4'-9"	926	132	1#	6'-11"			
4'-9"	927	132	1#	8'-1"			
4'-9"	928	132	1#	1'-0"			
4'-9"	929	132	1#	1'-0"			
4'-9"	930	132	1#	1'-0"			
4'-9"	931	132	1#	1'-0"			
4'-9"	932	132	1#	1'-0"			
4'-9"	933	132	1#	1'-0"			
4'-9"	934	132	1#	1'-0"			
4'-9"	935	132	1#	1'-0"			
4'-9"	936	132	1#	1'-0"			
4'-9"	937	132	1#	1'-0"			
4'-9"	938	132	1#	1'-0"			
4'-9"	939	132	1#	1'-0"			
4'-9"	940	132	1#	1'-0"			
4'-9"	941	132	1#	1'-0"			
4'-9"	942	132	1#	1'-0"			
4'-9"	943	132	1#	1'-0"			
4'-9"	944	132	1#	1'-0"			
4'-9"	945	132	1#	1'-0"			
4'-9"	946	132	1#	1'-0"			
4'-9"	947	132	1#	1'-0"			
4'-9"	948	132	1#	1'-0"			
4'-9"	949	132	1#	1'-0"			
4'-9"	950	132	1#	1'-0"			
4'-9"	951	132	1#	1'-0"			
4'-9"	952	132	1#	1'-0"			
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4'-9"	957	132	1#	1'-0"			
4'-9"	958	132	1#	1'-0"			
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4'-9"	976	132	1#	1'-0"			
4'-9"	977	132	1#	1'-0"			
4'-9"	978	132	1#	1'-0"			
4'-9"	979	132	1#	1'-0"			
4'-9"	980	132	1#	1'-0"			
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4'-9"	987	132	1#	1'-0"			
4'-9"	988	132	1#	1'-0"			
4'-9"	989	132	1#	1'-0"			
4'-9"	990	132	1#	1'-0"			
4'-9"	991	132	1#	1'-0"			
4'-9"	992	132	1#	1'-0"			
4'-9"	993	132	1#	1'-0"			
4'-9"	994	132	1#	1'-0"			
4'-9"	995	132	1#	1'-0"			
4'-9"	996	132	1#	1'-0"			
4'-9"	997	132	1#	1'-0"			
4'-9"	998	132	1#	1'-0"			
4'-9"	999	132	1#	1'-0"			
4'-9"	1000	132	1#	1'-0"			

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
BUREAU OF PLANS

KALIHI TUNNEL
KALIHI APPROACH ROAD
3-CELL R.C. BOX CULVERT
AT B.L. STA. 231+80.10

ENGINEER: *[Signature]* DATE: JULY 8, 1953
DRAFTSMAN: *[Signature]* CHECKED BY: *[Signature]*
SCALE: AS SHOWN TRACER: *[Signature]*
APPROVED: *[Signature]* APPROVED: *[Signature]*
CHIEF ENGINEER BUREAU ENGINEER

SECTION G JOB NO. 26-53 DWG. R-11

Sheet No. 20 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	1	20