

# CITY AND COUNTY OF HONOLULU

# KALIHI TUNNEL

## SECTION C                      JOB NO. 26-53

TUNNEL, SHAFT, APPROACH ROADS AND STREAM DIVERSION BY  
 CITY & COUNTY OF HONOLULU, HAWAII  
**DEPARTMENT OF PUBLIC WORKS**

JOHN H. WILSON, MAYOR                      WILLIAM C. VANNATTA, CHIEF ENGINEER  
 KARL A. SINCLAIR, ENGINEER, KALIHI TUNNEL  
 HAROLD W. BUTZINE, BUREAU ENGINEER, BUREAU OF PLANS

PORTALS AND BUILDINGS, ELECTRICAL, MECHANICAL AND VENTILATION SYSTEM BY  
**LAW & WILSON**  
 ARCHITECTS & ENGINEERS

ROAD DWGS..... SHEET NOS. 1 TO 78 INCL

APPROVED:

*[Signature]* \_\_\_\_\_ JULY 11, 1953  
 MANAGER & CHIEF ENGINEER, BOARD OF WATER SUPPLY

*B. J. McManus* \_\_\_\_\_ JULY 16, 1953  
 DIRECTOR, DIVISION OF SANITATION, BOARD OF HEALTH

*[Signature]* \_\_\_\_\_ JULY 17, 1953  
 PRESIDENT, BOARD OF AGRICULTURE AND FORESTRY

*[Signature]* \_\_\_\_\_ JULY 14, 1953  
 SUPERINTENDENT OF BUILDINGS, CITY & COUNTY

*[Signature]* \_\_\_\_\_ JULY 16, 1953  
 CHIEF ENGINEER, CITY & COUNTY OF HONOLULU

*[Signature]* \_\_\_\_\_ JULY 14, 1953  
 ENGINEER, KALIHI TUNNEL



SHT. NO.	DWG. NO.	TITLE
<b>● INFORMATION</b>		
1	X-1	TITLE SHEET
2	X-2	LIST OF DRAWINGS
3	X-3	VICINITY MAP
4	X-4	PROJECT LOCATION & LIMITS OF WORK
5	X-5	TRIANGULATION
6	X-6	SOIL INVESTIGATION DATA
7	X-7	CURVE DATA, KALIHI END OF TUNNEL
8	X-8	CURVE DATA, KANEHOE END OF TUNNEL
9	X-9	GENERAL LIMITS OF TUNNEL & PORTAL WORK

SHT. NO.	DWG. NO.	TITLE
<b>● KALIHI APPROACH ROAD</b>		
10	R-1	TYPICAL SECTION
11	R-2	PLAN & PROFILE
12	R-3	PLAN & PROFILE
13	R-4	PORTAL VICINITY DETAILS
14	R-5	STANDARD DETAILS
15	R-6	STANDARD DETAILS
16	R-7	STANDARD DETAILS
17	R-8	STANDARD DETAILS - OMITTED
18	R-9	CULVERT DETAILS
19	R-10	CULVERT DETAILS
20	R-11	CULVERT DETAILS
21	R-12	CROSS SECTIONS
22	R-13	CROSS SECTIONS
23	R-14	CROSS SECTIONS
24	R-15	CROSS SECTIONS
25	R-16	CROSS SECTIONS
26	R-17	CROSS SECTIONS
27	R-18	CROSS SECTIONS
28	R-19	CROSS SECTIONS
29	R-20	CROSS SECTIONS
30	R-21	CROSS SECTIONS
31	R-22	CROSS SECTIONS
32	R-23	CROSS SECTIONS
33	R-24	CROSS SECTIONS
34	R-25	CROSS SECTIONS
35	R-26	LIGHTING & SIGNAL LAYOUT
36	R-27	ROADWAY LIGHTING DETAILS
37	R-28	REGULATORY & WARNING SIGNS

SHT. NO.	DWG. NO.	TITLE
<b>● KANEHOE APPROACH ROAD</b>		
38	R-29	PLAN & PROFILE
39	R-30	PORTAL VICINITY DETAILS
40	R-31	CROSS SECTIONS
41	R-32	CROSS SECTIONS
42	R-33	CROSS SECTIONS
43	R-34	CROSS SECTIONS
44	R-35	CROSS SECTIONS
45	R-36	LIGHTING & SIGNAL LAYOUT

SHT. NO.	DWG. NO.	TITLE
<b>● VENTILATION BLDG. ACCESS ROAD</b>		
46	A-1	PLAN & PROFILE
47	A-2	PLAN & PROFILE
48	A-3	CULVERT DETAILS
49	A-4	CULVERT DETAILS
50	A-5	CULVERT DETAILS
51	A-6	CROSS SECTIONS
52	A-7	CROSS SECTIONS
53	A-8	CROSS SECTIONS
54	A-9	CROSS SECTIONS
55	A-10	CROSS SECTIONS
56	A-11	CROSS SECTIONS
57	A-12	CROSS SECTIONS

SHT. NO.	DWG. NO.	TITLE
<b>● STREAM DIVERSION</b>		
58	S-1	TYPICAL SECTIONS
59	S-2	PLAN & PROFILE
60	S-3	PLAN & PROFILE
61	S-4	PLAN & PROFILE
62	S-5	INTERSECTION DETAILS
63	S-6	TRANSITION DETAILS
64	S-7	CROSS SECTIONS
65	S-8	CROSS SECTIONS
66	S-9	CROSS SECTIONS
67	S-10	CROSS SECTIONS
68	S-11	CROSS SECTIONS
69	S-12	CROSS SECTIONS
70	S-13	CROSS SECTIONS
71	S-14	CROSS SECTIONS

SHT. NO.	DWG. NO.	TITLE
72	S-15	CROSS SECTIONS
73	S-16	CROSS SECTIONS
74	S-17	CROSS SECTIONS
<b>● LANDSCAPING</b>		
75	L-1	KALIHI APPROACH ROAD
76	L-2	KALIHI PORTAL
77	L-3	ACCESS ROAD, VENT. BLDG., & STREAM DIVERSION CHANNELS
78	L-4	KANEHOE PORTAL

SHT. NO.	DWG. NO.	TITLE
<b>● TUNNEL &amp; SHAFT</b>		
79	T-1	PLAN & PROFILE
80	T-2	SECTIONAL PLAN & PROFILE
81	T-3	KEY PLAN - ELECTRICAL
82	T-4	KEY PLAN - C.O. SAMPLING INLET BOXES
83	T-5	TUNNEL SECTIONS - KALIHI SIDE
84	T-6	TUNNEL SECTIONS - KANEHOE SIDE
85	T-7	TYPICAL MODULE - CEILING
86	T-8	ENTRANCE LIGHTING FRAME LAYOUT - KALIHI SIDE
87	T-9	ENTRANCE LIGHTING FRAME LAYOUT - KANEHOE SIDE
88	T-10	TYPICAL MODULE - INSERTS & CONDUIT
89	T-11	MISCELLANEOUS DETAILS
90	T-12	ROADWAY & DRAINAGE, TYPICAL MODULES
91	T-13	ROADWAY & DRAINAGE, DETAILS
92	T-14	ROADWAY & DRAINAGE, DUCT DETAILS
93	T-15	ROADWAY & DRAINAGE, HANDHOLE DETAILS
94	T-16	GLAZED TILE LINING - RIGHT WALL
95	T-17	GLAZED TILE LINING - LEFT WALL
96	T-18	GLAZED TILE LINING DETAILS
97	T-19	TUNNEL INTERIOR LIGHTING BOX
98	T-20	COMMUNICATION STATION BOX
99	T-21	FIRE EXTINGUISHER BOX
100	T-22	C.O. SAMPLING INLET BOX
101	T-23	CABLE SUPPORT BOX
102	T-24	VENTILATION SLOT DETAILS
103	T-25	TUNNEL ENTRANCE LIGHTING BOX FRAME
104	T-26	CEILING HATCH DETAILS
105	T-27	AIRTIGHT DOOR - ASSEMBLY
106	T-28	AIRTIGHT DOOR - WELDMENTS
107	T-29	AIRTIGHT DOOR - DETAILS
108	T-30	AIRTIGHT DOOR - DETAILS

SHT. NO.	DWG. NO.	TITLE
<b>● TRANSITION</b>		
109	T-31	PLAN & SECTIONS
110	T-32	PLAN ABOVE TUNNEL CEILING & ELEVATION
111	T-33	PLANS ABOVE TUNNEL & SECTION
112	T-34	STRUCTURAL - LONGITUDINAL & CROSS SECTIONS
113	T-35	STRUCTURAL - FIN - 1 & DETAILS
114	T-36	STRUCTURAL - FINS - 2,3,4 & DETAILS
115	T-37	STRUCTURAL - SHAFT & PASSAGE DETAILS
116	T-38	STRUCTURAL - STAIRS & MISC. DETAILS
117	T-39	UTILITY HOIST ROOM
118	T-40	UTILITY HOIST, SHAFT & STAGING
119	T-41	TUNNEL WALL, CEILING & MISC. DETAILS
120	T-42	CONDUIT LAYOUT & DETAILS
121	T-43	ROADWAY AND DRAINAGE DETAILS
122	T-44	TUNNEL & PORTAL SIGNS

SHT. NO.	DWG. NO.	TITLE
<b>● KALIHI PORTAL</b>		
123	P-1	SITE PLAN
124	P-2	PLAN
125	P-3	PLAN ABOVE TUNNEL CEILING
126	P-4	ELEVATION
127	P-5	SECTION THRU PORTAL, RIGHT
128	P-6	SECTION THRU PORTAL, LEFT
129	P-7	CROSS SECTIONS
130	P-8	STAIR DETAILS
131	P-9	OFFICE & VAULT, ELEVATIONS, SECTIONS & DETAILS
132	P-10	OFFICE & VAULT, WINDOW, DOOR & LOUVER DETAILS
133	P-11	STRUCTURAL, LAYOUT PLAN
134	P-12	STRUCTURAL, FOUNDATION PLAN
135	P-13	STRUCTURAL, FOUNDATION PLAN
136	P-14	STRUCTURAL, TUNNEL ENTRANCE, PLAN & ELEVATION
137	P-15	STRUCTURAL, TUNNEL ENTRANCE, PLAN SECTIONS & DETAILS
138	P-16	STRUCTURAL, TUNNEL ENTRANCE, ROOF PLAN & STAIRS
139	P-17	STRUCTURAL, TUNNEL ENTRANCE, SECTIONS & DETAILS
140	P-18	STRUCTURAL, TUNNEL ENTRANCE, SECTIONS & DETAILS
141	P-19	STRUCTURAL, PORTAL WALL, PLAN, ELEVATION & DETAILS
142	P-20	STRUCTURAL, PORTAL WALL, SECTIONS & DETAILS

SHT. NO.	DWG. NO.	TITLE
143	P-21	STRUCTURAL, PORTAL WALL, SECTIONS & DETAILS
144	P-22	STRUCTURAL, OFFICE & VAULT, PLANS, SECTIONS, & DETAILS
145	P-23	STRUCTURAL, OFFICE & VAULT, DETAILS
146	P-24	DRAINAGE & DUCT LAYOUTS
147	P-25	CONDUIT LAYOUT & OFFICE WIRING
148	P-26	ELECTRICAL MANHOLE DETAILS
149	P-27	ELECTRICAL DUCTS & SIGNAL DETAILS
150	P-28	WATERTIGHT SEWAGE TANK
<b>● KANEHOE PORTAL</b>		
151	P-29	SITE PLAN
152	P-30	PLAN OF EXCAVATION WORK ACCOMPLISHED BY OTHERS
153	P-31	PLAN
154	P-32	PLAN ABOVE TUNNEL CEILING
155	P-33	ELEVATION
156	P-34	SECTION THRU PORTAL, RIGHT
157	P-35	SECTION THRU PORTAL, LEFT
158	P-36	CROSS SECTIONS
159	P-37	STAIR DETAILS
160	P-38	OFFICE & VAULT, ELEVATIONS, SECTIONS & DETAILS
161	P-39	STRUCTURAL, LAYOUT PLAN, ELEVATION & DETAILS
162	P-40	STRUCTURAL, FOUNDATION PLAN
163	P-41	STRUCTURAL, FOOTING PLAN
164	P-42	STRUCTURAL, PLAN AT ROADWAY
165	P-43	STRUCTURAL, TUNNEL ENTRANCE, PLAN & SECTIONS
166	P-44	STRUCTURAL, TUNNEL ENTRANCE, FOUNDATION PLAN & STAIR DETAILS
167	P-45	STRUCTURAL, TUNNEL ENTRANCE, PLANS ABOVE CEILING
168	P-46	STRUCTURAL, TUNNEL ENTRANCE, PLAN AT ROOF & CROSS SECTIONS
169	P-47	STRUCTURAL, TUNNEL ENTRANCE, SECTIONS
170	P-48	STRUCTURAL, PORTAL WALL ELEVATION
171	P-49	STRUCTURAL, PORTAL WALL SECTIONS & DETAILS
172	P-50	STRUCTURAL, OFFICE & VAULT PLANS & DETAILS
173	P-51	STRUCTURAL, OFFICE & VAULT SECTIONS & DETAILS
174	P-52	DRAINS ABOVE PORTAL WALL
175	P-53	DRAINAGE & DUCT LAYOUTS
176	P-54	CONDUIT LAYOUT & OFFICE WIRING

SHT. NO.	DWG. NO.	TITLE
<b>● VENTILATION BLDG.</b>		
177	VB-1	SITE PLAN
178	VB-2	GROUND FLOOR PLAN
179	VB-3	MEZZANINE FLOOR PLAN
180	VB-4	SECOND FLOOR PLAN
181	VB-5	MOTOR DECK FLOOR PLAN
182	VB-6	ELEVATIONS
183	VB-7	ELEVATIONS
184	VB-8	SECTION - TRANSVERSE
185	VB-9	SECTION - LONGITUDINAL
186	VB-10	GROUND FLOOR PLAN
187	VB-11	SECOND FLOOR PLAN
188	VB-12	MOTOR DECK FLOOR PLAN
189	VB-13	WALL SECTIONS & DETAILS
190	VB-14	GIRT FRAMING & DETAILS
191	VB-15	WINDOW & LOUVER DETAILS
192	VB-16	DOOR & WINDOW SCHEDULE & DETAILS
193	VB-17	CONTROL ROOM & TOILET ROOM DETAILS
194	VB-18	MISC. DETAILS
195	VB-19	MISC. DETAILS
196	VB-20	STAIR DETAILS
197	VB-21	FAN DUCT DETAILS
198	VB-22	FAN DISCHARGE DUCT DETAILS
199	VB-23	STRUCTURAL, VENT FLARE, PLANS
200	VB-24	STRUCTURAL, VENT FLARE, SECTIONS
201	VB-25	STRUCTURAL, VENT FLARE, DETAILS
202	VB-26	STRUCTURAL, FOUNDATION PLAN
203	VB-27	STRUCTURAL, GROUND FLOOR & MEZZANINE FLOOR PLANS
204	VB-28	STRUCTURAL, FOUNDATION & GROUND FLOOR DETAILS
205	VB-29	STRUCTURAL, 2ND FLOOR FRAMING PLAN & DETAILS
206	VB-30	STRUCTURAL, MEZZANINE & 2ND FLOOR DETAILS
207	VB-31	STRUCTURAL, RIGID FRAME DETAILS
208	VB-32	STRUCTURAL, MOTOR DECK FRAMING PLAN & DETAILS
209	VB-33	STRUCTURAL, TYPICAL DETAILS
210	VB-34	STRUCTURAL, TYPICAL DETAILS
211	VB-35	STRUCTURAL, FRONT WALL ELEVATION & DETAILS
212	VB-36	STRUCTURAL, EXTERIOR RET. WALL - RIGHT & TYPICAL INTERIOR WALL
213	VB-37	STRUCTURAL, EXTERIOR RET. WALL - LEFT
214	VB-38	STRUCTURAL, TYPICAL RET. WALL SECTIONS
215	VB-39	STRUCTURAL, ROOF FRAMING PLAN & DETAILS
216	VB-40	STRUCTURAL, TRUSS DETAILS

SHT. NO.	DWG. NO.	TITLE
217	VB-41	STRUCTURAL, TRUSS & COLUMN DETAILS
218	VB-42	PLUMBING - GROUND FLOOR PLAN & DETAILS
219	VB-43	PLUMBING - 2ND FLOOR PLAN & DETAILS
220	VB-44	WATER STORAGE TANK
221	VB-45	WATERTIGHT SEWAGE TANK
222	VB-46	ELECTRIC LIGHTING REFLECTED CEILING PLANS
223	VB-47	ELECTRIC LIGHTING REFLECTED ROOF PLAN
224	VB-48	ELEVATION OF VENTILATION FANS
<b>● VENTILATION</b>		
225	V-1	C.O. SAMPLING SYSTEM
226	V-2	TUNNEL SECTION
227	V-3	C.O. ANALYZER EQUIPMENT - SCHEMATIC
228	V-4	C.O. SAMPLING INLET DETAIL
<b>● ELECTRICAL</b>		
229	E-1	ONE LINE DIAGRAM
230	E-2	TUNNEL INTERIOR LIGHTING WIRING DIAGRAM
231	E-3	TUNNEL INTERIOR LIGHTING LUMINAIRE DETAILS
232	E-4	TUNNEL INTERIOR LIGHTING BOX EQUIPMENT ASSEMBLY
233	E-5	TUNNEL ENTRANCE LIGHTING WIRING DIAG. & LUMINAIRE DETAILS
234	E-6	TUNNEL ENTRANCE LIGHTING INSTALLATION DETAILS
235	E-7	TUNNEL EMERGENCY LIGHTING & AIR DUCT LIGHTING
236	E-8	TUNNEL COMMUNICATION STATION DETAILS
237	E-9	TUNNEL COMMUNICATION STATION BOX ASSEMBLY & WIRING DIAG.
238	E-10	TUNNEL TRAFFIC SIGNAL SYSTEM WIRING DIAGRAM
239	E-11	TUNNEL TRAFFIC SIGNAL SYSTEM CONTROL PANELS
240	E-12	TRANSITION & SHAFT LIGHTING & WIRING DETAILS
241	E-13	KALIHI PORTAL VAULT WIRING DIAGRAM & DETAILS
242	E-14	KALIHI PORTAL VAULT EQUIPMENT LAYOUT
243	E-15	KANEHOE PORTAL VAULT EQUIPMENT LAYOUT
244	E-16	VENTILATION BLDG. H.E. CO. TRANSFORMER STATION
245	E-17	VENTILATION BLDG. EQUIPMENT & GROUND FLOOR CONDUIT ROUTING
246	E-18	VENTILATION BLDG. MOTOR BRANCH CIRCUIT CONDUIT ROUTING
247	E-19	VENTILATION BLDG. LUMINAIRE LOCATION & CONDUIT ROUTING - LONGIT. SECT.
248	E-20	VENTILATION BLDG. LUMINAIRE LOCATION & CONDUIT ROUTING TRANS. SECT.
249	E-21	VENTILATION BLDG. TRANSFORMER VAULT DETAILS
250	E-22	VENTILATION BLDG. MISC. EQUIPMENT INSTALLATION DETAILS
251	E-23	VENTILATION BLDG. MOTOR CONTROL DETAILS
252	E-24	VENTILATION BLDG. MAIN CONTROL SWITCHBOARD

NOTE: DRAWINGS ARE BOUND IN 3 SETS AS FOLLOWS:  
**ROAD DWGS..... SHEET NOS. 1 TO 78 INCL.**  
**TUNNEL DWGS..... SHEET NOS. 79 TO 176 INCL.**  
**VENTILATION & ELECTRICAL DWGS. } ... SHEET NOS. 177 TO 252 INCL.**

LAW & WILSON	
ARCHITECTS & ENGINEERS	
DEPARTMENT OF PUBLIC WORKS	
CITY AND COUNTY OF HONOLULU	
BUREAU OF PLANS	
<b>KALIHI TUNNEL</b>	
<b>LIST OF DRAWINGS</b>	
ENGINEER: L.S.W., M.L.S., S.O.C.H.	DATE: JULY 18, 1953
DRAFTSMAN: K.A.	CHECKED BY: W.S.
APPROVED: <i>[Signature]</i>	TRACER: <i>[Signature]</i>
CHIEF ENGINEER	BUREAU ENGINEER
W.S. PROFILE	C.S.
D.S. C.S.	S.S.
L.W.S. E.W. BY:	S. BY:

APPROVED: <i>[Signature]</i>	SECTION C	JOB NO. 26-53	DWG. X-2
ENGINEER, KALIHI TUNNEL			



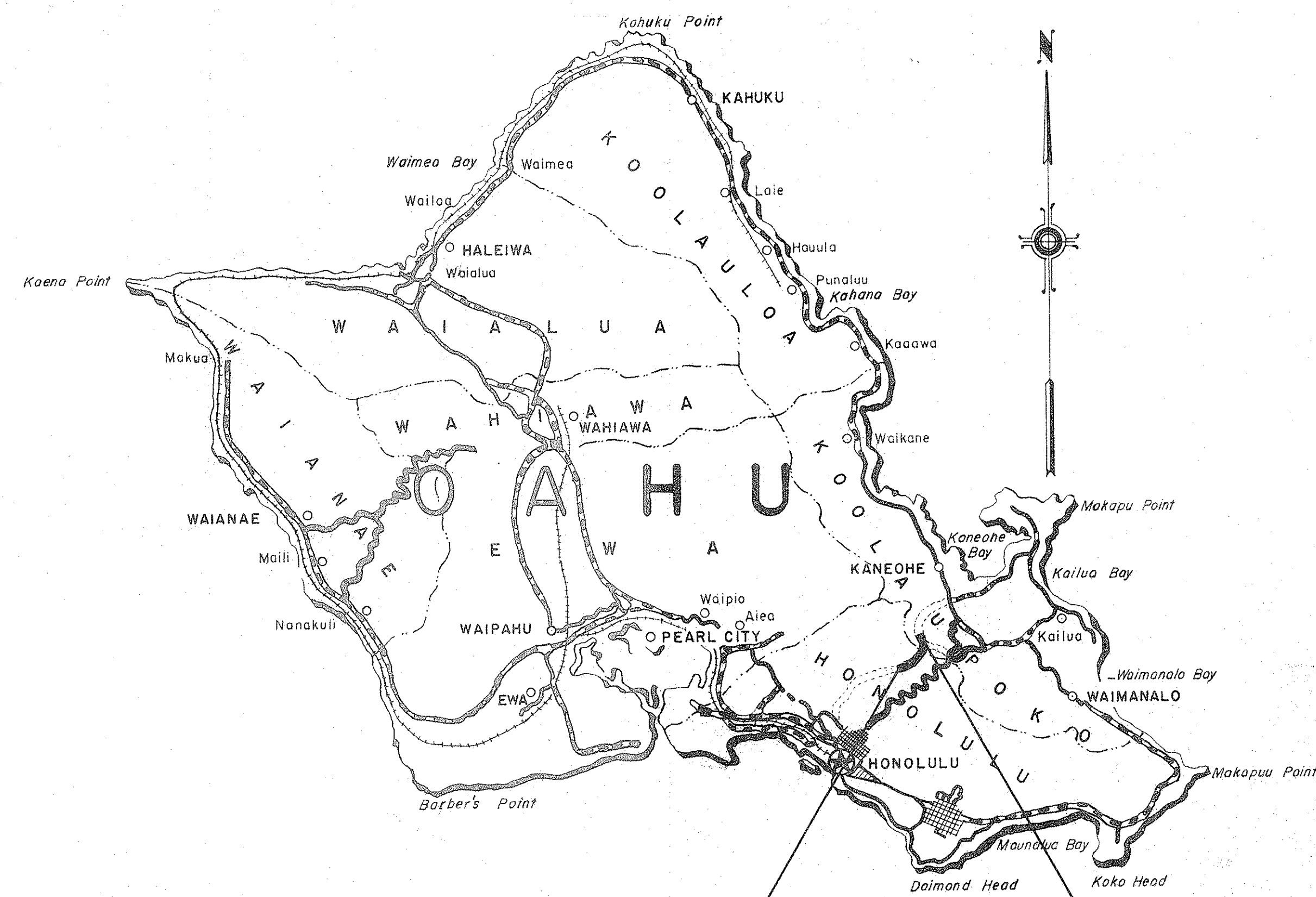
CONVENTIONAL SIGNS	
Base Line	
Boundary Line	
Forest Reserve Boundary	
Dry Stream	
Existing Road	
Concrete Pipe Culvert	
Concrete Drop Intake	
Standard Manhole	
Cast Iron Frame & Grating	
Standard Catch Basin	
Concrete Curb	
Guard Rail	
Grouted Rubble Paving	
Bench Mark	
C & C Street Survey Monument	
Regulatory & Warning Signs	

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

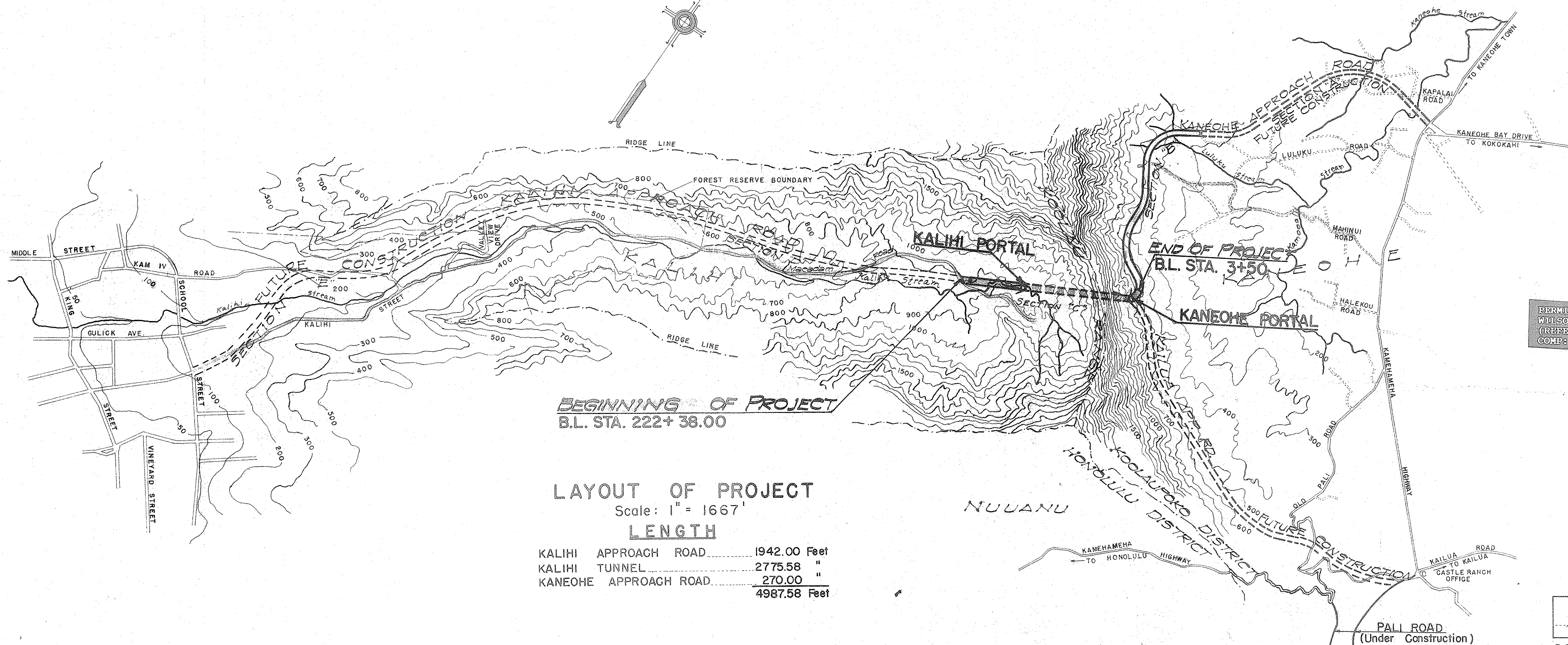
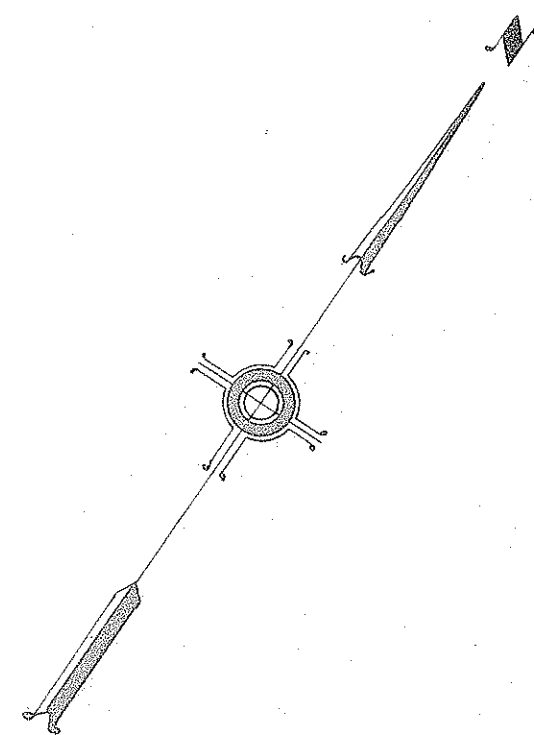
JOB NO. 26-53

KALIHI TUNNEL  
SECTION "C"

KALIHI AND KANEHOE, OAHU, T.H.



SCALES  
PLAN 1 in. = 50 ft.  
PROFILE Hor. 1 in. = 50 ft.  
Vert. 1 in. = 10 ft.  
CROSS-SECTION Hor. 1 in. = 10 ft.  
Vert. 1 in. = 10 ft.



BEGINNING OF PROJECT  
B.L. STA. 222+ 38.00

LAYOUT OF PROJECT  
Scale: 1" = 1667'

LENGTH

KALIHI APPROACH ROAD	1942.00 Feet
KALIHI TUNNEL	2775.58 "
KANEHOE APPROACH ROAD	270.00 "
<b>TOTAL</b>	<b>4987.58 Feet</b>

Permit # 0-91-998  
Wilson Tunnel - Cellular Phone Sites  
Refer to the I. Detour  
Date: 10/20/97

Maintenance Permit # 516  
Clearing of Wilson Tunnel  
Comp. 8/28/98

Permit # 0-24-74  
Clearing of Wilson Tunnel  
Comp. 8/20/97

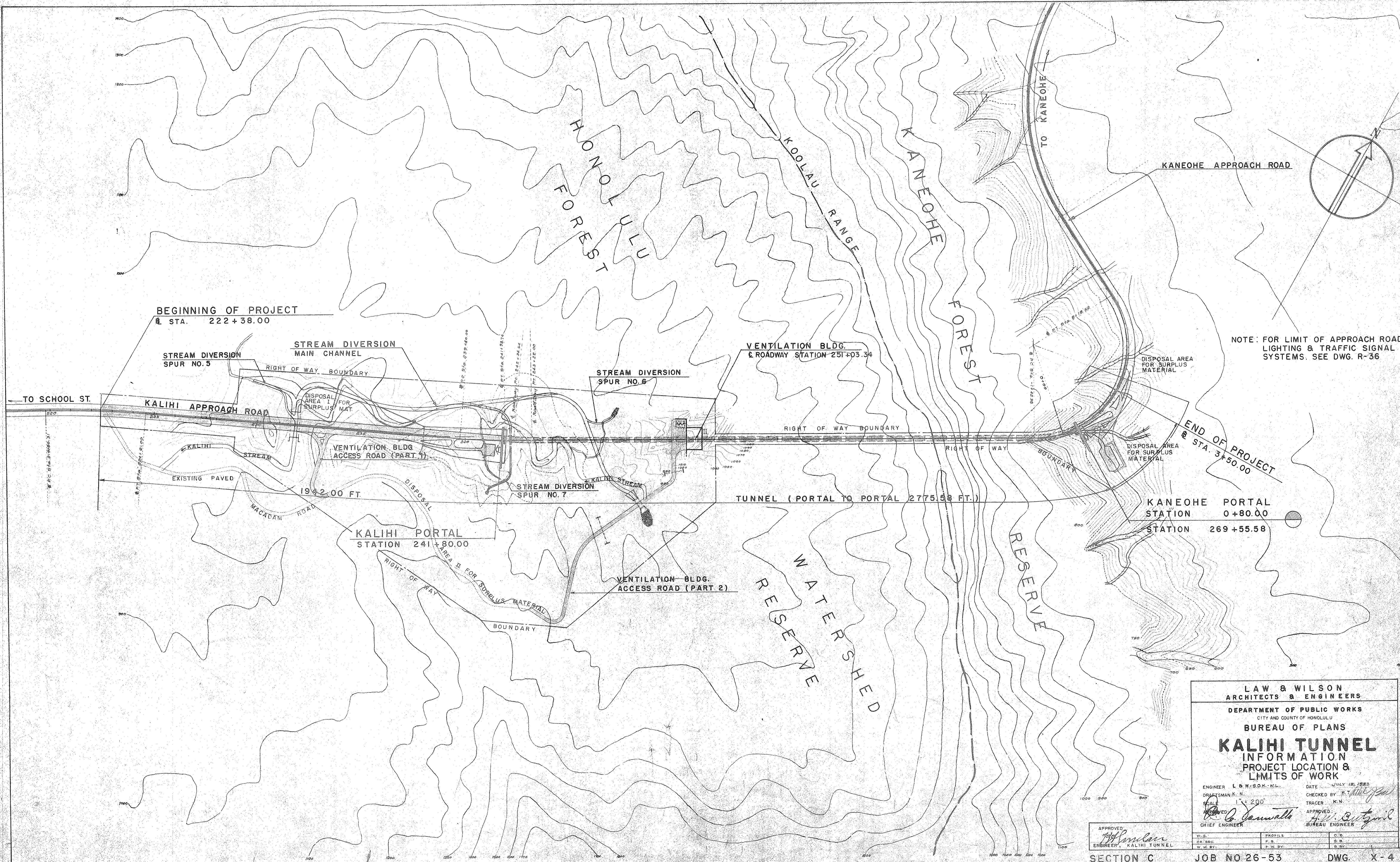
PERMIT NO. 0-96-36  
WILSON TUNNEL - CELLULAR PHONE SITES  
(REFER TO PERMIT PLAN FOR DETAILS)  
COMP: 04/04/97

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
VICINITY MAP

ENGINEER: S.C.H.-R.W. DATE: JULY 15, 1953  
DRAFTSMAN: J.S. CHECKED BY: S.C.H.-R.W.  
SCALE: 1" = 1667' TRACER: J.S.  
APPROVED: *A. J. Yamamoto* APPROVED: *H. W. Butzard*  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
C. S.	F. B.	S. B.
W. M. BY:	F. W. BY:	S. BY:





BEGINNING OF PROJECT  
@ STA. 222+38.00

STREAM DIVERSION  
SPUR NO. 5

STREAM DIVERSION  
MAIN CHANNEL

VENTILATION BLDG.  
& ROADWAY STATION 251+03.34

STREAM DIVERSION  
SPUR NO. 6

DISPOSAL AREA  
FOR SURPLUS  
MATERIAL

NOTE: FOR LIMIT OF APPROACH ROAD  
LIGHTING & TRAFFIC SIGNAL  
SYSTEMS. SEE DWG. R-36

TO SCHOOL ST.

KALIHI APPROACH ROAD

RIGHT OF WAY BOUNDARY

RIGHT OF WAY BOUNDARY

END OF PROJECT  
@ STA. 3+50.00

VENTILATION BLDG  
ACCESS ROAD (PART 1)

STREAM DIVERSION  
SPUR NO. 7

TUNNEL (PORTAL TO PORTAL 2775.58 FT.)

KANEOHE PORTAL  
STATION 0+80.00

STATION 269+55.58

KALIHI PORTAL  
STATION 241+80.00

VENTILATION BLDG.  
ACCESS ROAD (PART 2)

RESERVE  
WATERSHED

LAW & WILSON  
ARCHITECTS & ENGINEERS

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

**KALIHI TUNNEL**  
INFORMATION  
PROJECT LOCATION &  
LIMITS OF WORK

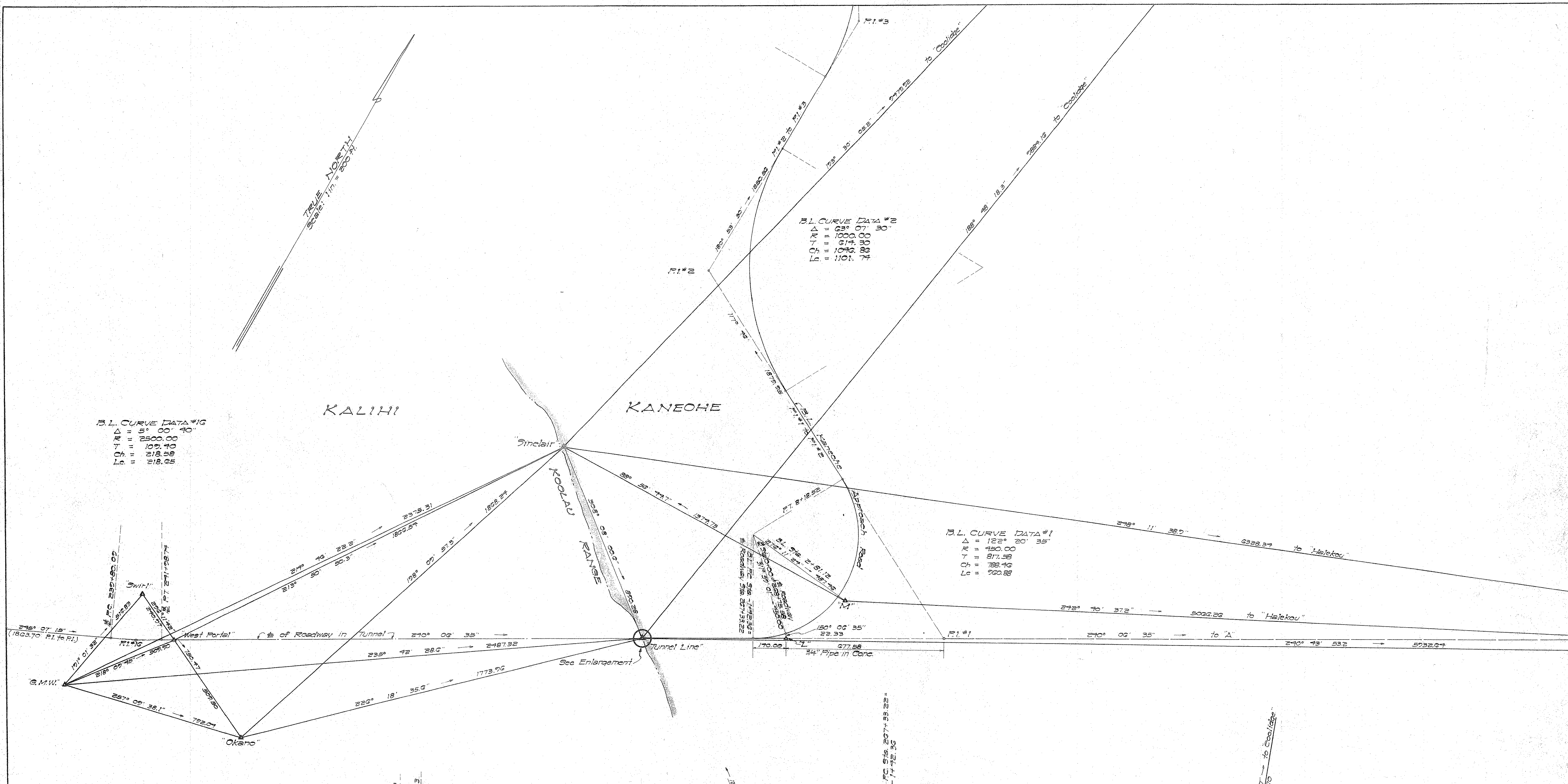
ENGINEER L. W. & S. H. WILSON DATE JULY 15, 1958  
DRAFTSMAN K. N. CHECKED BY H. A. JONES  
SCALE 1" = 200' TRACER K. N.  
APPROVED: *C. J. Jaramilla* APPROVED: *H. W. B. Jorgensen*  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILES	C. S.
C. S.	F. S.	F. S.
W. M. BY:	F. W. BY:	F. W. BY:

APPROVED: *H. A. Jorgensen*  
ENGINEER, KALIHI TUNNEL

SECTION C JOB NO 26-53 DWG. X-4





B.L. CURVE DATA #16  
 $\Delta = 5^{\circ} 00' 40''$   
 $T.R. = 2500.00$   
 $C = 109.40$   
 $L_c = 218.98$   
 $L_s = 218.95$

B.L. CURVE DATA #2  
 $\Delta = 63^{\circ} 07' 30''$   
 $T.R. = 1000.00$   
 $C = 1045.80$   
 $L_c = 1101.48$   
 $L_s = 1101.48$

B.L. CURVE DATA #1  
 $\Delta = 122^{\circ} 20' 35''$   
 $T.R. = 450.00$   
 $C = 817.98$   
 $L_c = 788.46$   
 $L_s = 760.88$

NOTE: ALL AZIMUTHS ARE BASED ON MERIDIAN THRU  $\Delta$  'Kalihi'-- (Subtract  $\alpha_3 = 0^{\circ} 01' 45''$  to get on  $\Delta$  'Mokauos' base).

All points marked thus:  $\Delta$  are 1" pipe except as noted.

P.I.#16 to P.I.#1 = 3461.46

SCHEMATIC DIAGRAM OF BASE LINE ACROSS RIDGE (NOT TO SCALE)

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHI TUNNEL**  
 TUNNEL LINE TRIANGULATION

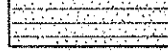


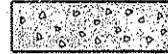

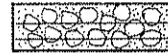
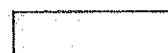

ENGINEER S.O.H. R.W. DATE JULY 15, 1953  
 DRAFTSMAN R.W. J.S. CHECKED BY S.O.H. R.W.  
 SCALE AS NOTED TRACER J.S.  
 APPROVED *[Signature]* APPROVED *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED	PROFILE	C.D.
<i>[Signature]</i>		
ENGINEER KALIHI TUNNEL	F.B.	S.B.
	P.W.B.Y.	S.B.Y.



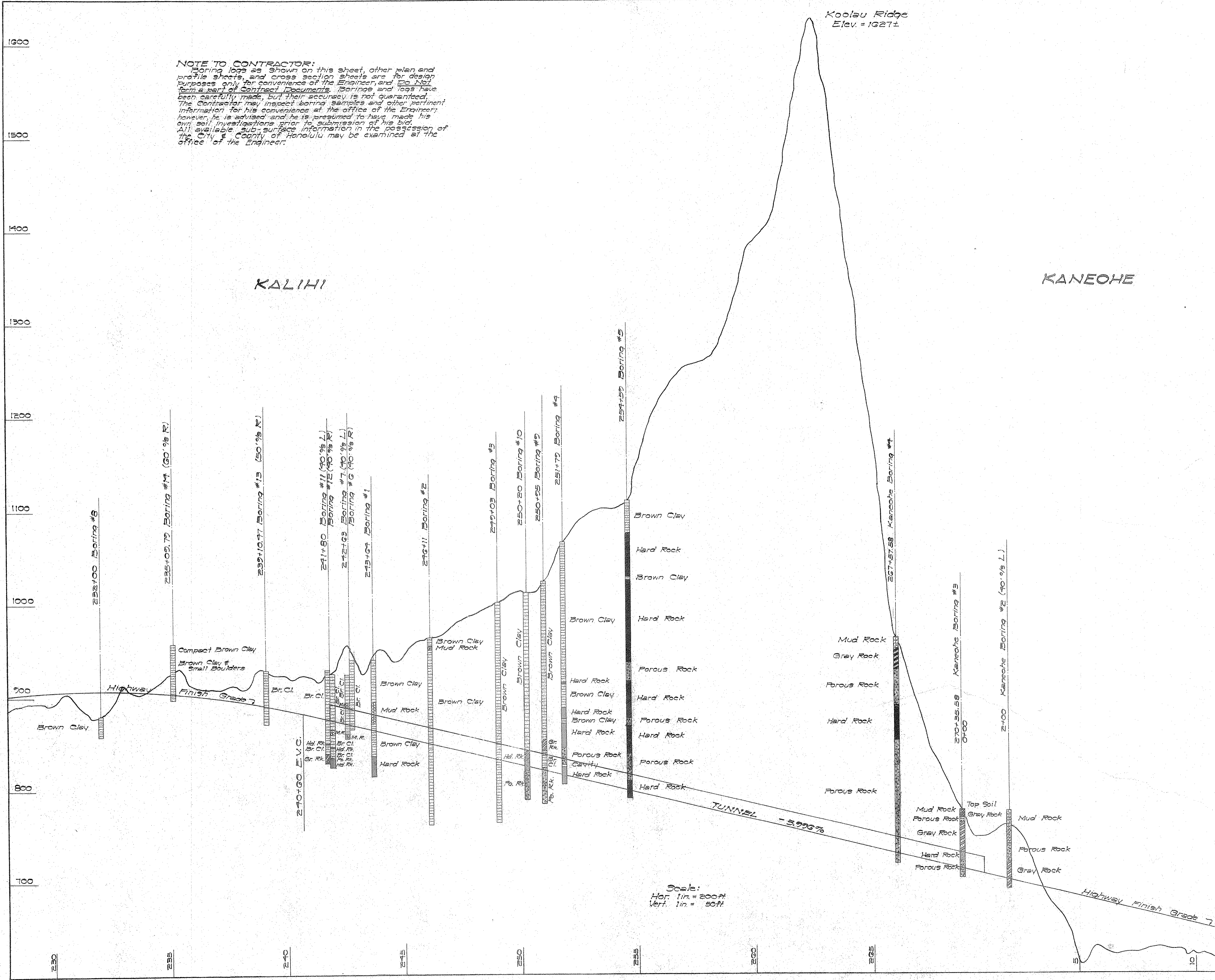
**NOTE TO CONTRACTOR:**  
 Boring logs as shown on this sheet, other plan and profile sheets, and cross section sheets are for design purposes only for convenience of the Engineer, and do not form a part of Contract Documents. Borings and logs have been carefully made, but their accuracy is not guaranteed. The Contractor may inspect boring samples and other pertinent information for his convenience at the office of the Engineer; however, he is advised and he is presumed to have made his own soil investigations prior to submission of his bid. All available sub-surface information in the possession of the City & County of Honolulu may be examined at the office of the Engineer.

**LEGEND**

-  Brown Clay
-  Hard Rock
-  Mud Rock
-  Porous Rock
-  Gray Rock
-  Mud Rock & Clay
-  Cavity
-  Top Soil

**Abbreviations:**

- Brown Clay..... Br. Cl.
- Hard Rock..... Hd. Rk.
- Porous Rock..... Po. Rk.
- Mud Rock..... M. R.
- Gray Rock..... Gr. Rk.



Scale:  
 Hor. 1 in. = 200 ft.  
 Vert. 1 in. = 50 ft.

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHU TUNNEL**  
**SOIL INVESTIGATION**

ENGINEER S.C.H. DATE JULY 15, 1953  
 DRAFTSMAN J.S. CHECKED BY S.C.H. - R.W.  
 SCALE AS NOTED TRACER J.S.  
 APPROVED: *S. J. Yamamoto* CHIEF ENGINEER  
 APPROVED: *H. W. Burtz* BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. N. BY:	F. W. BY:	S. BY:

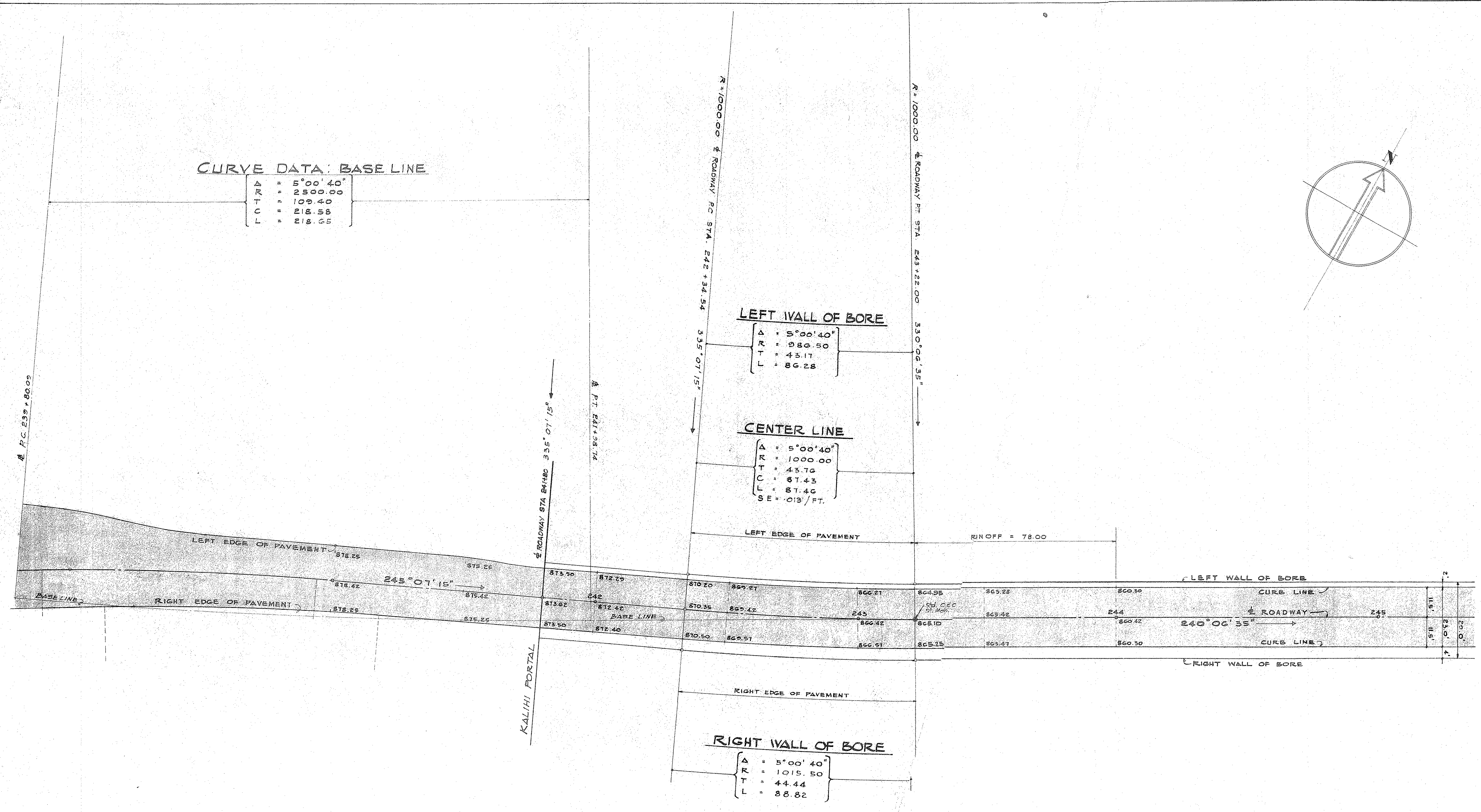
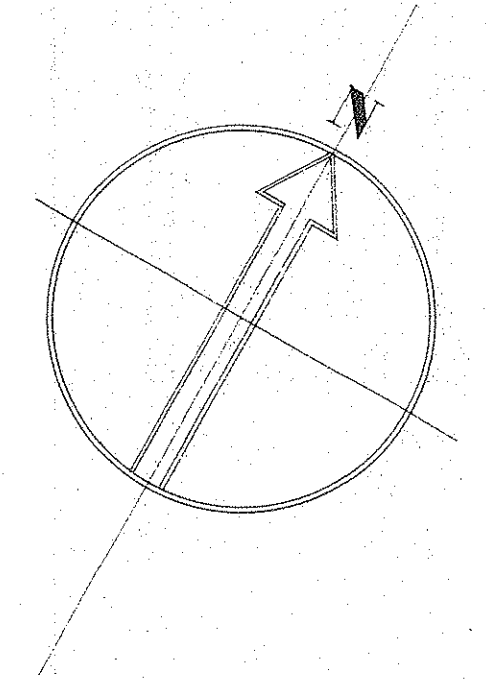
APPROVED: *W. S. Anderson* ENGINEER, KALIHU TUNNEL

SECTION C JOB NO. 26-53 DWG. X-6



CURVE DATA: BASE LINE

Δ = 5°00'40"  
 R = 2500.00  
 T = 100.40  
 C = 218.88  
 L = 218.65



LAW & WILSON  
 ARCHITECTS & ENGINEERS  
 DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 INFORMATION  
 CURVE DATA  
 KALIHI END OF TUNNEL

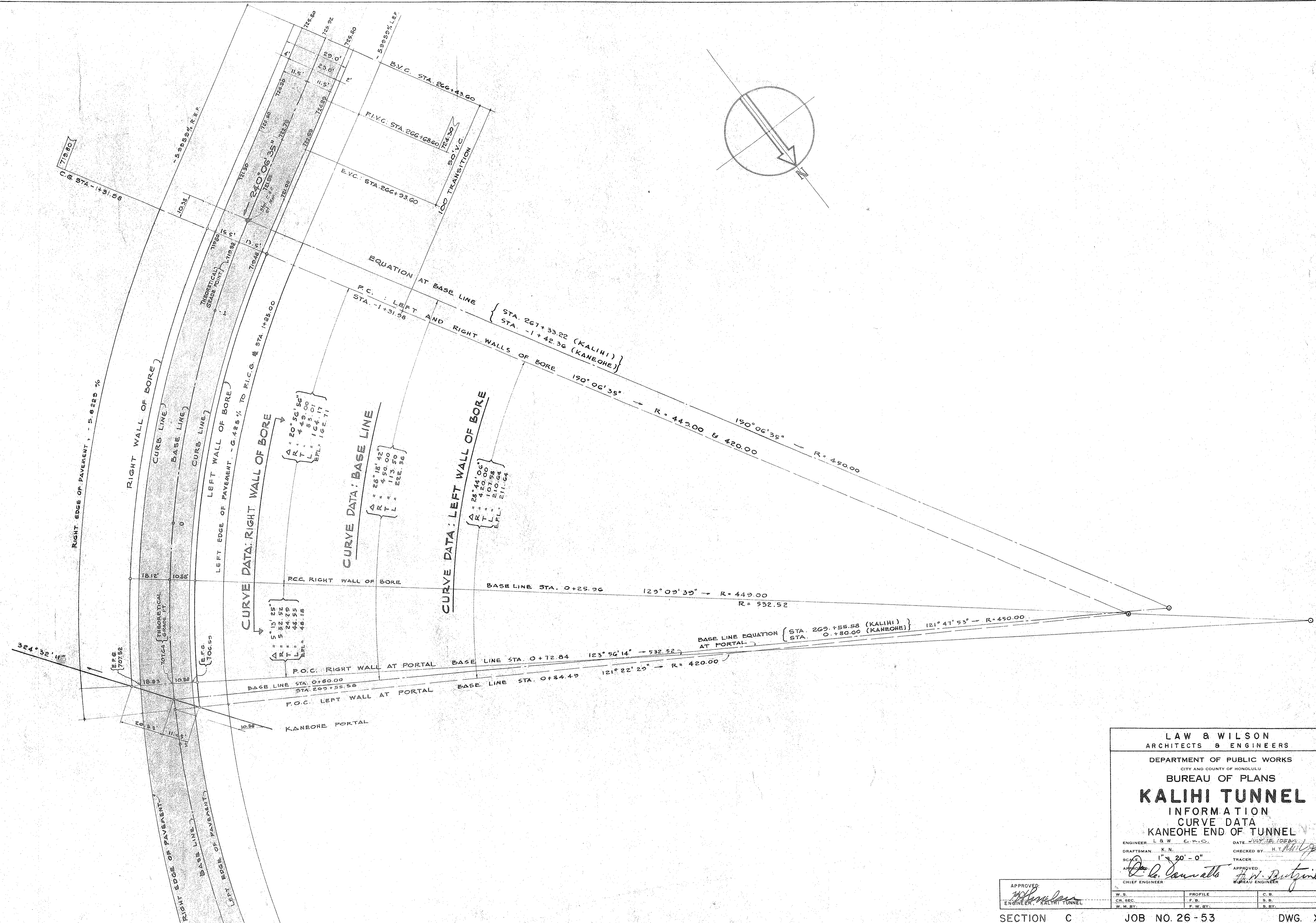
ENGINEER: L.S.W. & L.C. DATE: JULY 16, 1953  
 DRAFTSMAN: K.N. CHECKED BY: H.T. [Signature]  
 SCALE: 1" = 20' TRACER: [Signature]  
 APPROVED: [Signature] CHIEF ENGINEER  
 APPROVED: [Signature] BUREAU ENGINEER

APPROVED:  
 [Signature]  
 ENGINEER, KALIHI TUNNEL

W.B.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M. BY:	F.W. BY:	S.W. BY:

SECTION C JOB NO. 26-53 DWG. X-7





LAW & WILSON  
ARCHITECTS & ENGINEERS  
CITY AND COUNTY OF HONOLULU  
DEPARTMENT OF PUBLIC WORKS  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
INFORMATION  
CURVE DATA  
KANEOHE END OF TUNNEL

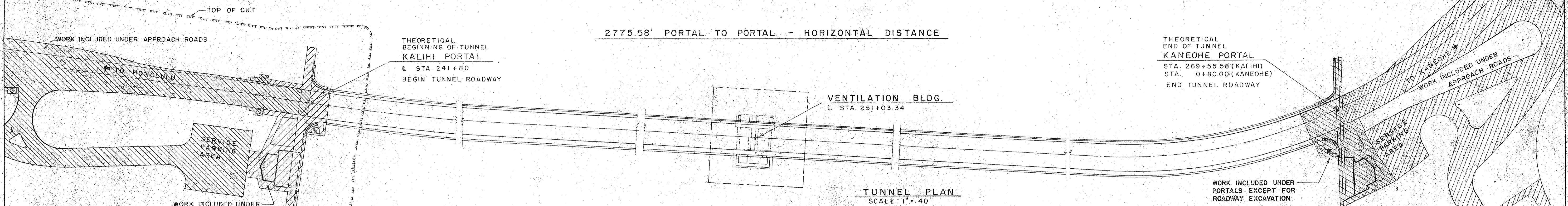
ENGINEER: L.B.W. E.K.C. DATE: JULY 18, 1958  
 DRAFTSMAN: K.N. CHECKED BY: H.T. [Signature]  
 SCALE: 1" = 20' - 0" TRACER:  
 APPROVED: [Signature] APPROVED: [Signature]  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED: [Signature]	PROFILE	C.B.
ENGINEER, KALIHI TUNNEL	F.B.	S.B.
W.M. BY:	F.W. BY:	S. BY:

SECTION C JOB NO. 26-53 DWG. X-8

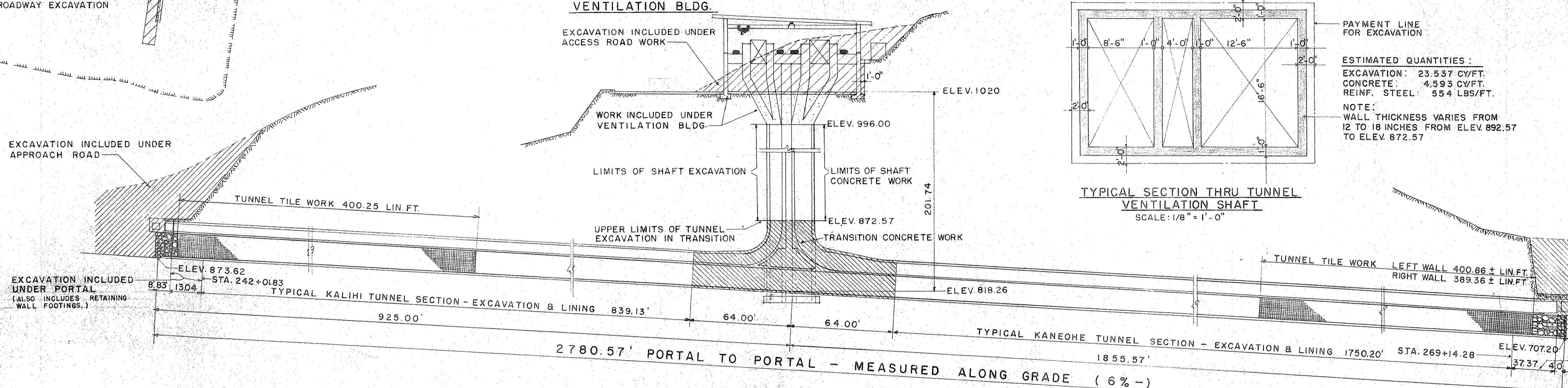


2775.58' PORTAL TO PORTAL - HORIZONTAL DISTANCE

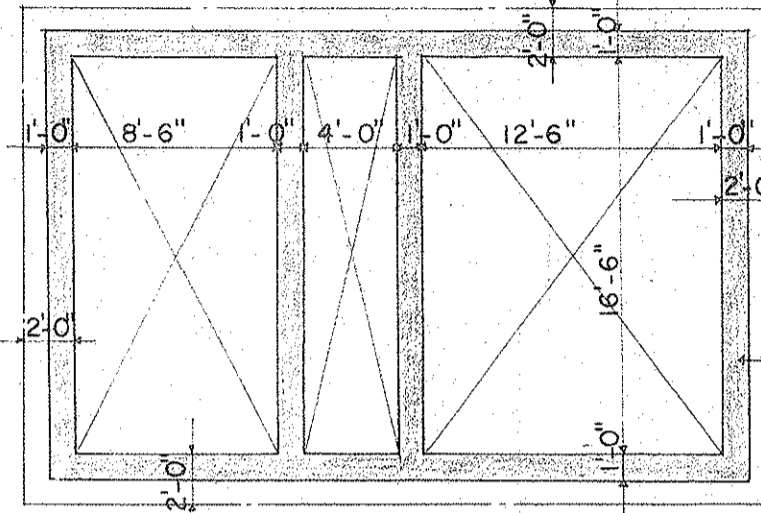


TUNNEL PLAN  
SCALE: 1" = 40'

VENTILATION BLDG.



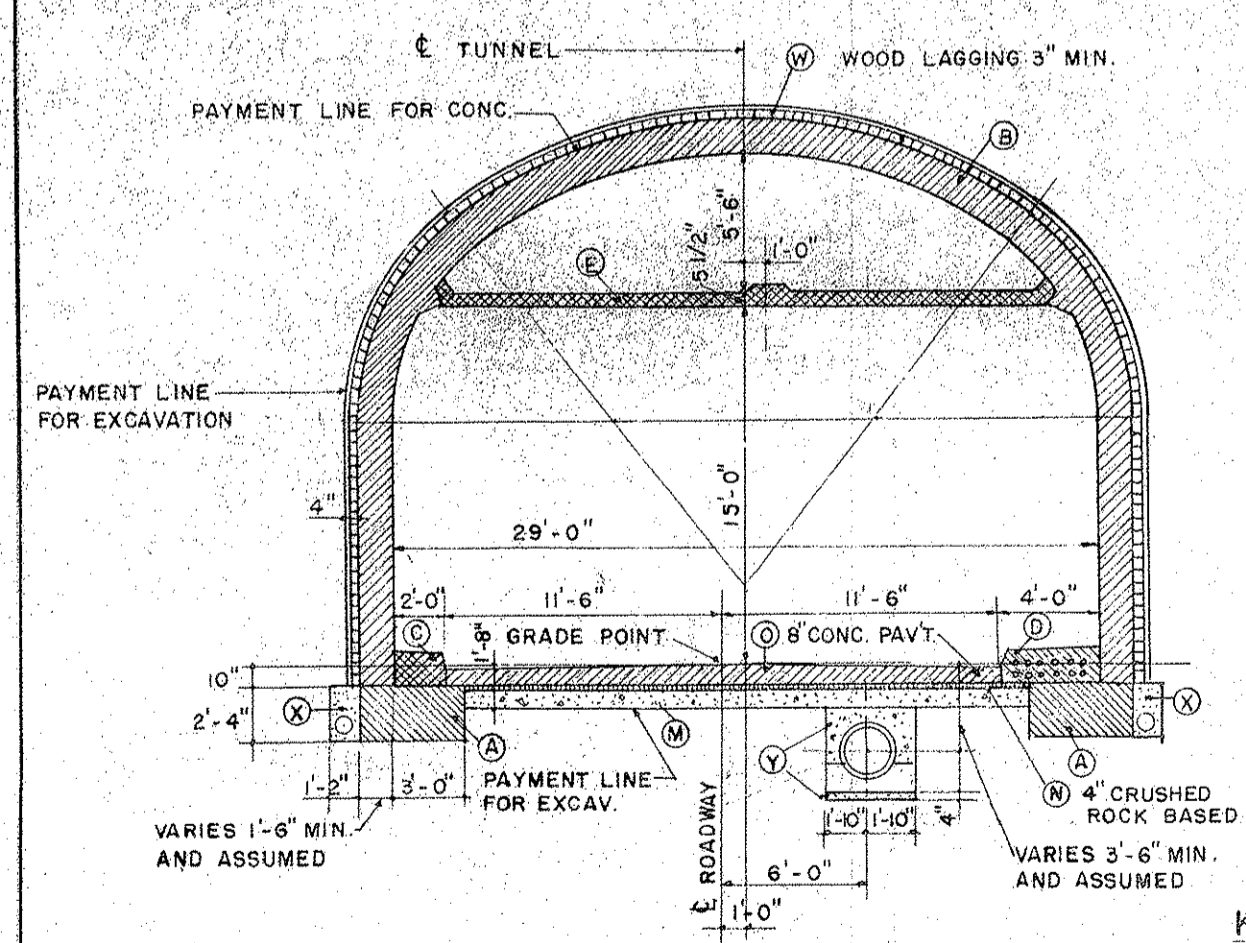
TUNNEL PROFILE  
SCALE: 1" = 40'



TYPICAL SECTION THRU TUNNEL  
VENTILATION SHAFT  
SCALE: 1/8" = 1'-0"

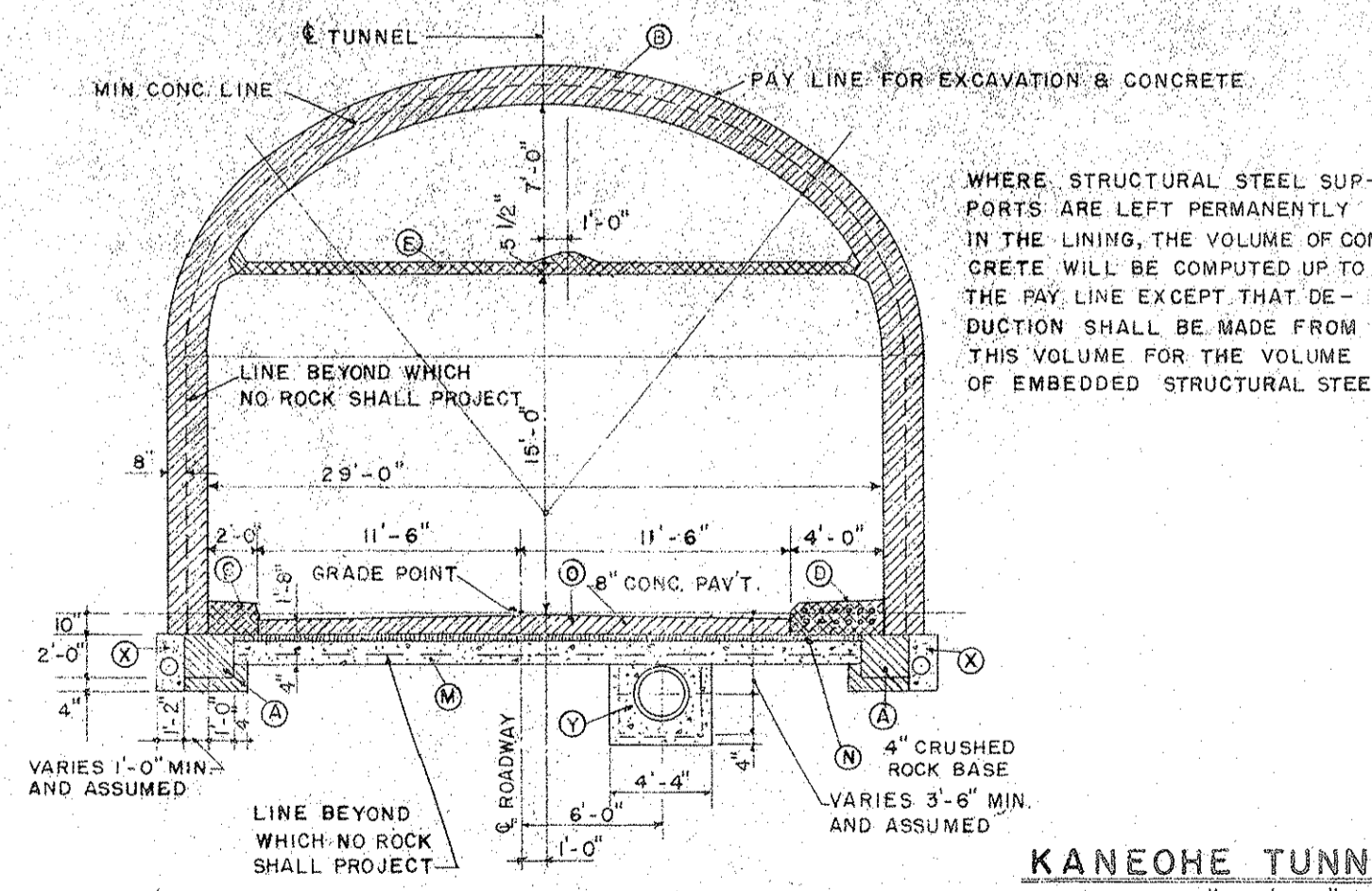
ESTIMATED QUANTITIES:  
EXCAVATION: 23.537 CY/FT.  
CONCRETE: 4.593 CY/FT.  
REINF. STEEL: 554 LBS/FT.  
NOTE:  
WALL THICKNESS VARIES FROM  
12 TO 18 INCHES FROM ELEV. 892.57  
TO ELEV. 872.57

NOTES:  
1. THIS SHEET OUTLINES IN GENERAL THE LIMITS OF SOME OF THE MAJOR ITEMS OF WORK. FOR MORE SPECIFIC DETAILS SEE PLANS - PROPOSAL & SPECIFICATIONS.  
2. ALL EXCAVATION SHALL BE UNCLASSIFIED WHETHER IT IS EARTH, ROCK, CINDERS OR OTHER MATERIALS.



KALIHI TUNNEL SECTION  
1/8" = 1'-0"

TUNNEL QUANTITIES		
W	TUNNEL EXCAVATION	27.872 CY/FT
W	WOOD LAGGING	201.1 BD. FT/FT
TUNNEL LINING		
A x 2	CONCRETE FOOTINGS	0.778 CY/FT
B	CONC. ARCH AND SIDE WALLS	3.593 CY/FT
C	CONC. FOR LEFT SIDE WALK	0.102 CY/FT
D	CONC. FOR RIGHT SIDE WALK	0.165 CY/FT
	(Minus nominal areas of ducts)	
E	CONC. FOR CEILING SLAB	0.462 CY/FT
X x 2	POROUS FILL	0.176 CY/FT
	(Minus nominal area of pipe)	
TUNNEL ROADWAY, DRAINAGE, BASE COURSE PAVING		
M	BALLAST COURSE	0.915 CY/FT
N	CRUSHED ROCK BASE	0.284 CY/FT
O	CONCRETE PAVING	0.568 CY/FT
V	POROUS ROCK FILL	0.237 CY/FT
	(Minus outside dia. pipe and cradle)	



KANEOHE TUNNEL SECTION  
1/8" = 1'-0"

TUNNEL QUANTITIES		
	TUNNEL EXCAVATION	29.605 CY/FT
TUNNEL LINING		
A x 2	CONCRETE FOOTINGS	0.375 CY/FT
B	CONC. ARCH AND SIDE WALLS	4.191 CY/FT
C	CONC. FOR LEFT SIDE WALK	0.102 CY/FT
D	CONC. FOR RIGHT SIDE WALK	0.165 CY/FT
	(Minus nominal areas of ducts)	
E	CONC. FOR CEILING SLAB	0.489 CY/FT
X x 2	POROUS FILL	0.176 CY/FT
	(Minus nominal area of pipe)	
TUNNEL ROADWAY, DRAINAGE, BASE COURSE PAVING		
M	BALLAST COURSE	0.938 CY/FT
N	CRUSHED ROCK BASE	0.333 CY/FT
O	CONCRETE PAVING	0.568 CY/FT
V	POROUS ROCK FILL	0.418 CY/FT
	(Minus outside dia. pipe)	

PARTIAL LIST OF QUANTITIES FOR TYPICAL TUNNEL SECTIONS

NOTE: THE TUNNEL DIMENSIONS AND QUANTITIES TABULATED ABOVE FOR ONE LINEAR FOOT OF TUNNEL ARE APPROXIMATE ONLY, BEING GIVEN AS A CONVENIENCE TO THE CONTRACTOR AND AS A BASIS FOR THE COMPARISON OF BIDS. THE CITY & COUNTY DOES NOT, EXPRESSLY OR BY IMPLICATION, AGREE THAT THE ACTUAL AMOUNT OF WORK WILL CORRESPOND THEREWITH.

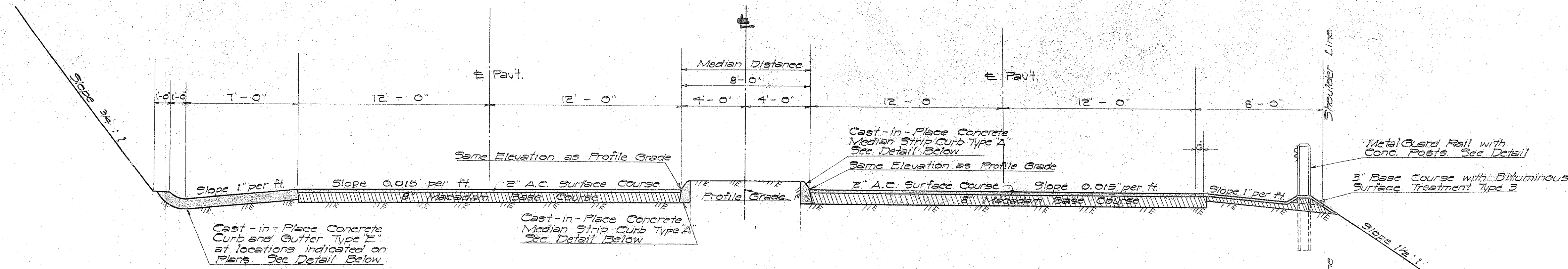
ESTIMATED OVERHAUL:  
ESTIMATED TUNNEL & TRANSITION EXCAVATION = 81,870 C.Y.  
47,870 C.Y. FREE HAUL.  
20,000 X 10 STA. = 200,000 STA. YARD OVERHAUL.  
14,000 X 0.5 MILE = 7,000 MILE YARD OVERHAUL.

LAW & WILSON  
ARCHITECTS & ENGINEERS  
DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
INFORMATION  
GENERAL LIMITS OF TUNNEL  
& PORTAL WORK  
ENGINEER: S.C.H. WILSON  
DRAFTSMAN: W.T. J.K.M.  
SCALE: AS NOTED  
APPROVED: *[Signature]*  
CHIEF ENGINEER

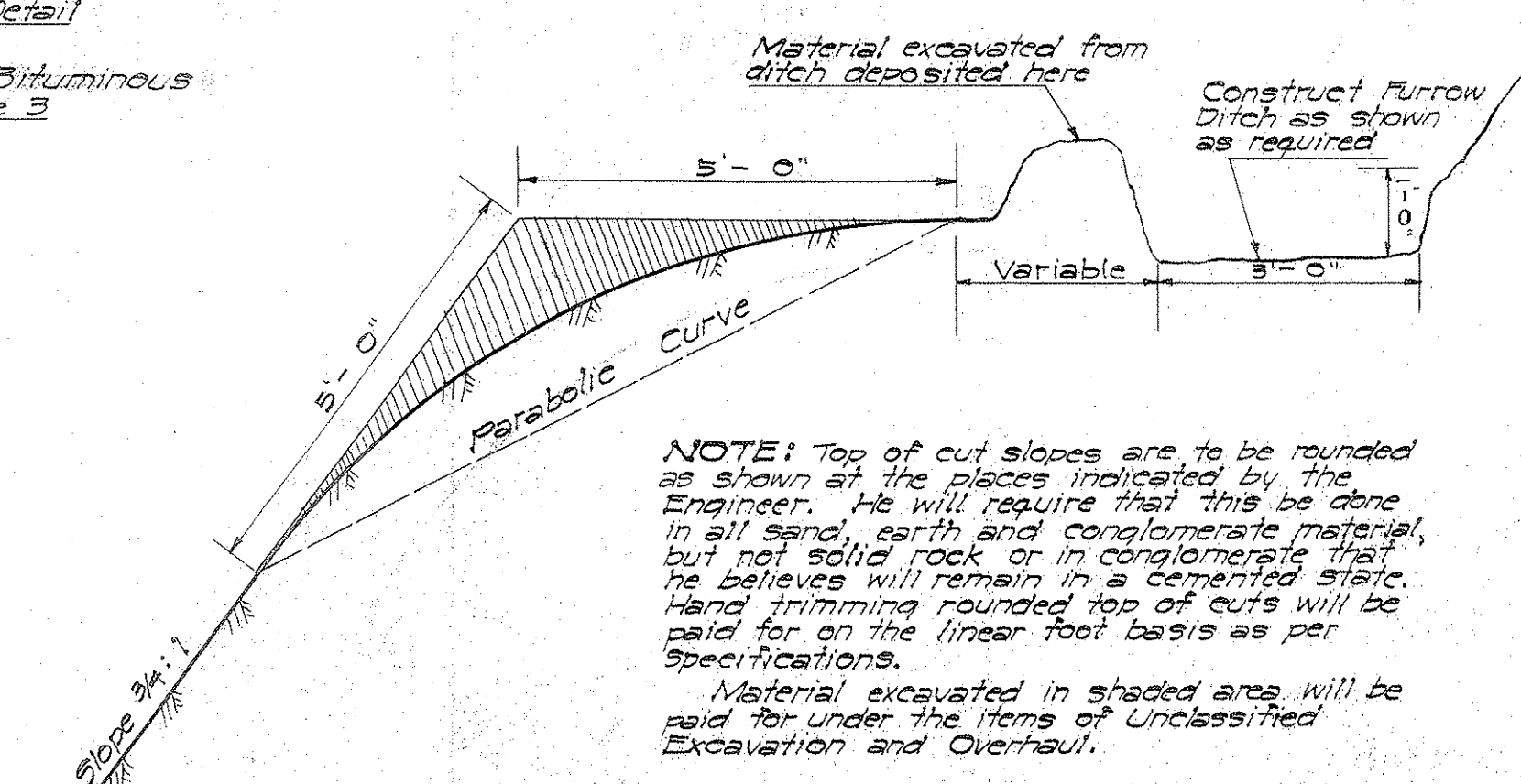
APPROVED:	PROFILE	C.B.
<i>[Signature]</i>	F.B.	S.B.
ENGINEER, KALIHI TUNNEL	F.W. BY:	S. BY:

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





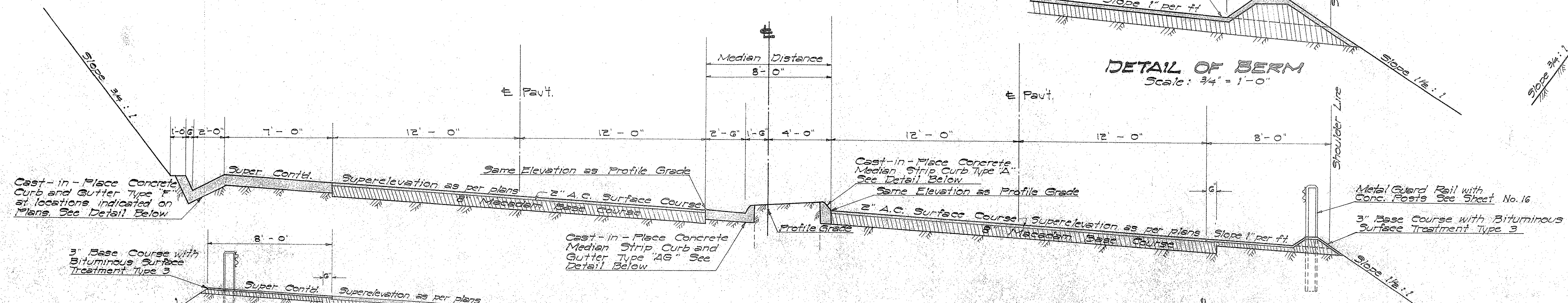
TYPICAL SECTION ON TANGENTS  
Scale: 1/4" = 1'-0"



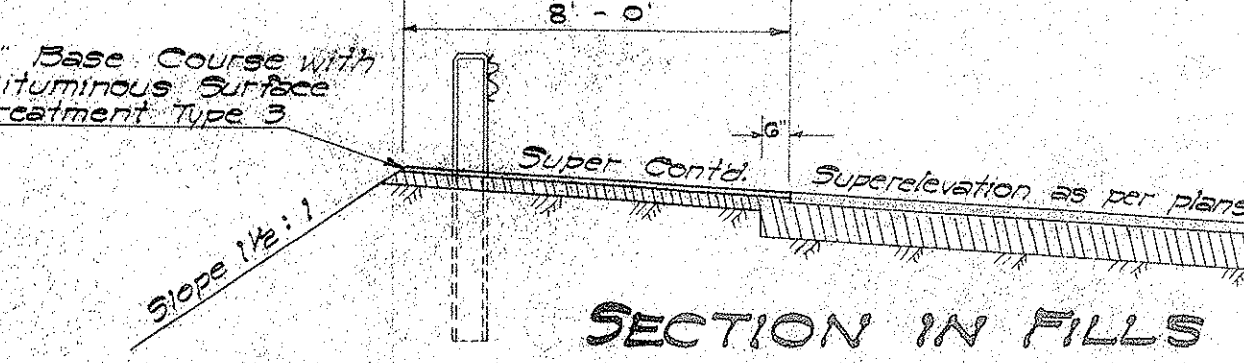
DETAIL OF BERM  
Scale: 3/4" = 1'-0"

DETAIL OF ROUNDED CUT SLOPE AND FURROW DITCH  
Scale: 1/2" = 1'-0"

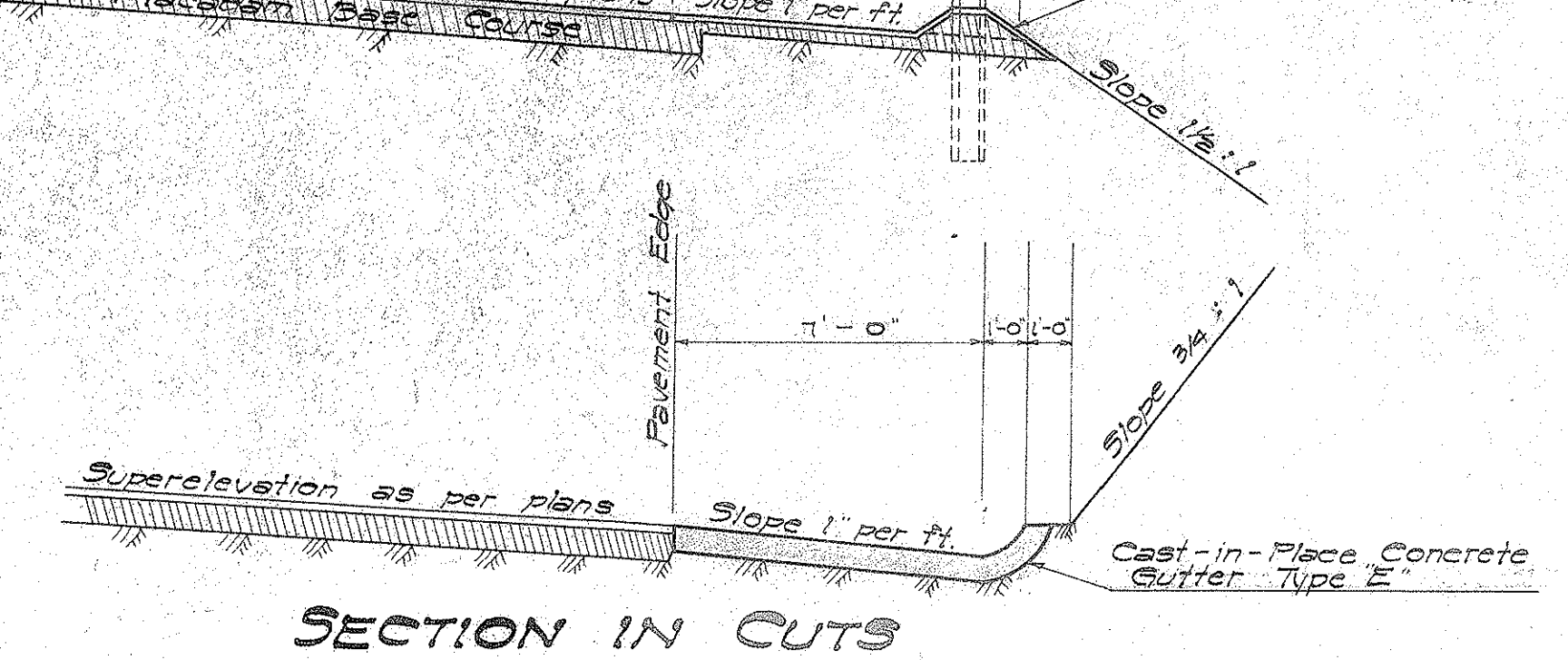
NOTE: Top of cut slopes are to be rounded as shown at five places indicated by the Engineer. He will require that this be done in all sand, earth and conglomerate material, but not solid rock or in conglomerate that he believes will remain in a cemented state. Hand trimming rounded top of cuts will be paid for on the linear foot basis as per specifications. Material excavated in shaded area will be paid for under the items of Unclassified Excavation and Overhaul.



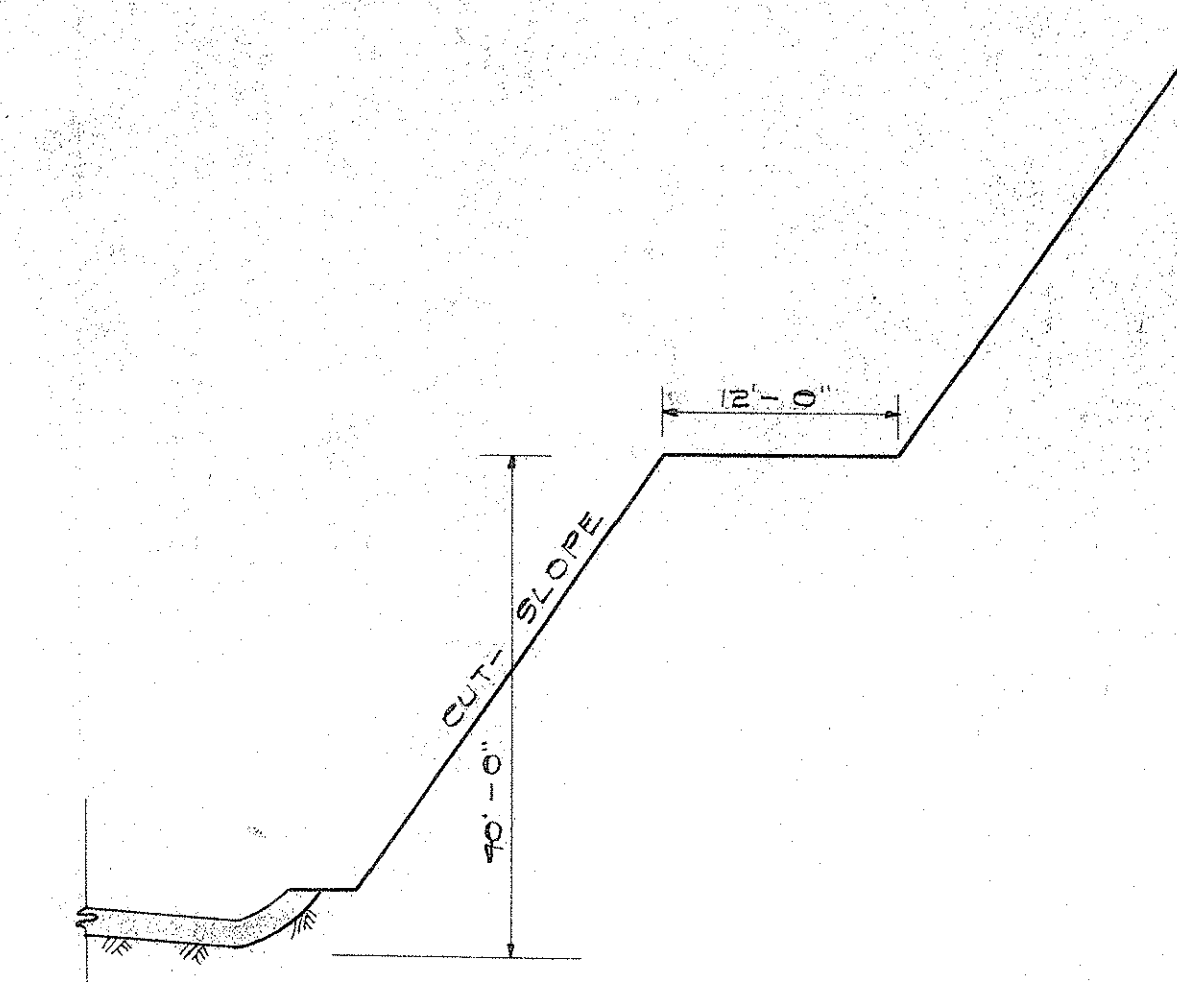
TYPICAL SECTION ON CURVES  
Scale: 1/4" = 1'-0"



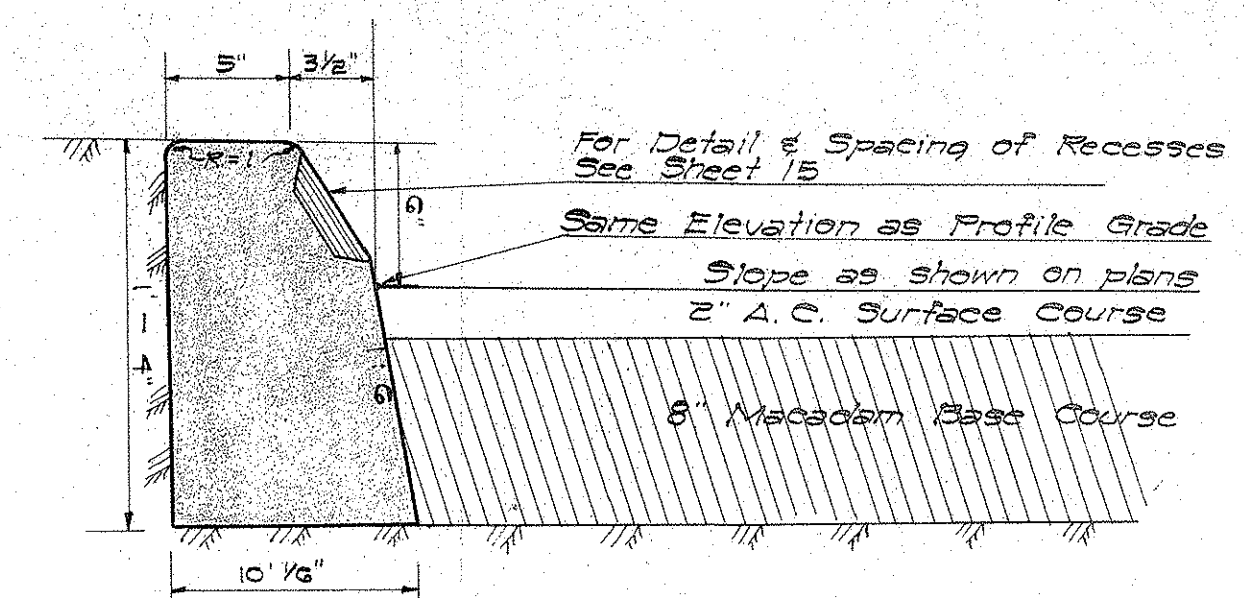
SECTION IN FILLS



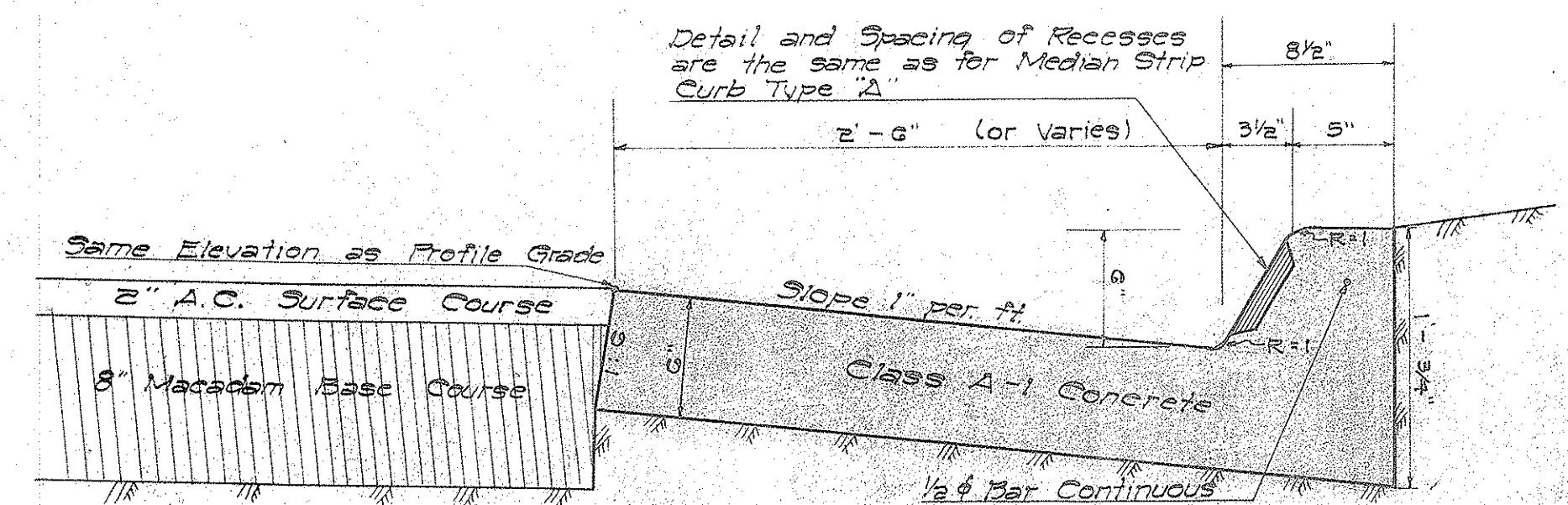
SECTION IN CUTS



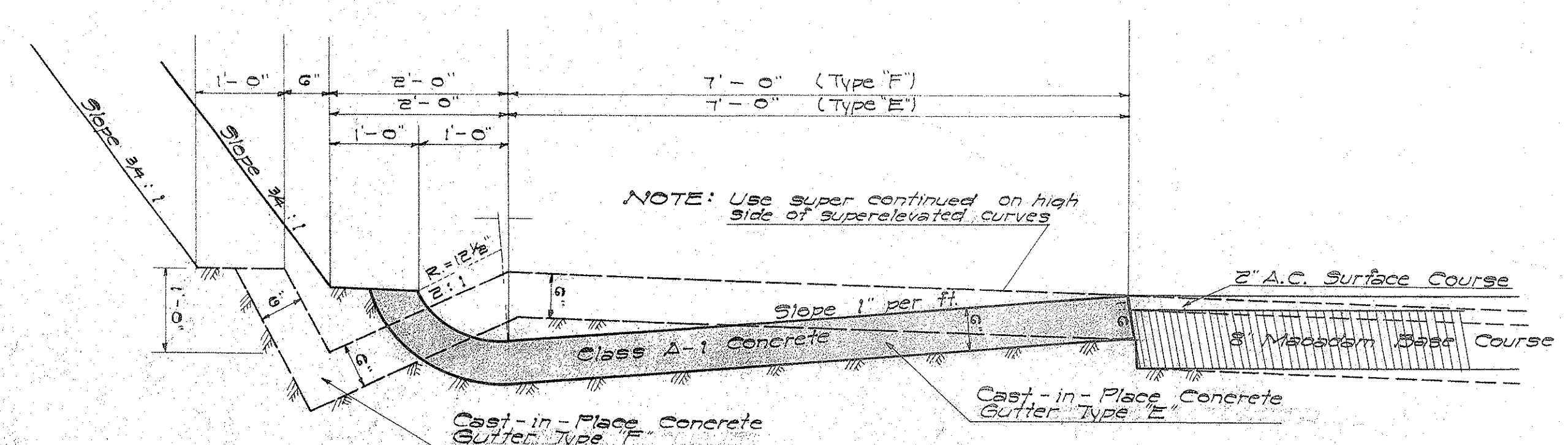
DETAIL OF BENCHING  
NOT TO SCALE  
UPHILL SIDE ONLY  
WHERE REQUIRED



DETAIL OF CAST-IN-PLACE MEDIAN STRIP CURB TYPE "A"  
Scale: 1 1/2" = 1'-0"



DETAIL OF CAST-IN-PLACE MEDIAN STRIP CURB & GUTTER TYPE "AG"  
Scale: 1 1/2" = 1'-0"



DETAIL OF CAST-IN-PLACE GUTTERS TYPE "E" AND TYPE "F"  
Scale: 3/4" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
APPROACH ROADS  
TYPICAL SECTIONS

ENGINEER S.O.H.-R.H. DATE JULY 15, 1953  
DRAFTSMAN R.W.-J.S. CHECKED BY S.O.H.-R.H.  
SCALE As Shown TRACER J.S.  
APPROVED *[Signature]* APPROVED *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY.	E. W. BY.	S. BY.



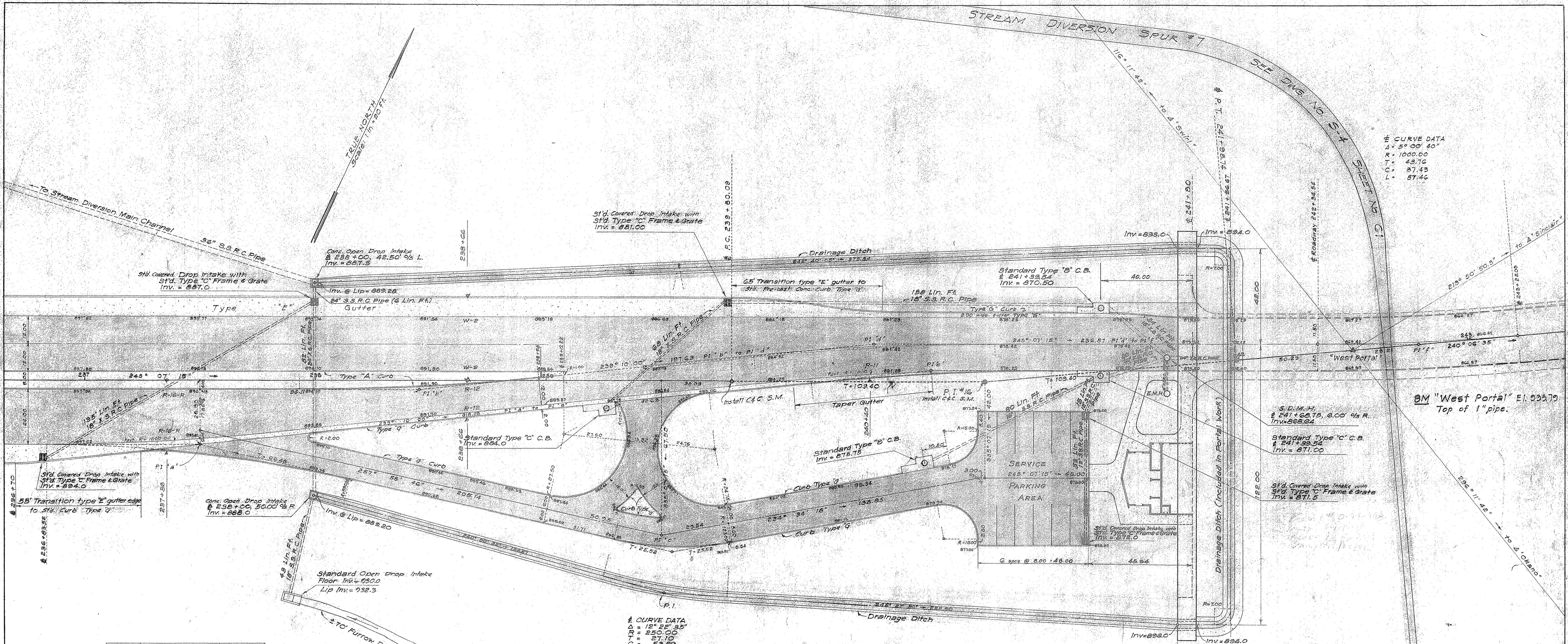








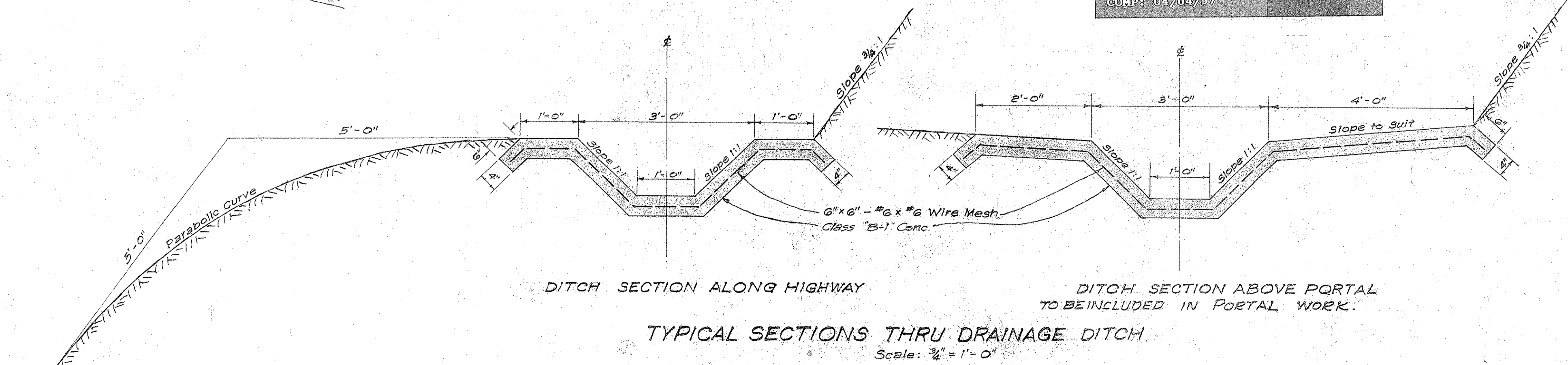
# CURVE DATA  
 Δ = 5° 05' 40"  
 R = 1000.00  
 T = 43.76  
 C = 87.43  
 L = 87.46



P.I.	# Station	T.O.
a	237+50	28.00 R
b	238+45.11	4.00 R
c	239+50	67.50 R
d	240+41.67 along tangent	16.50 L
e	240+66.41 "	5.00 L
f	242+78.84	0.00
Portal	241+72.57	0.00

# CURVE DATA  
 Δ = 12° 22' 35"  
 R = 250.00  
 T = 21.10  
 C = 53.89  
 L = 54.00

CURVE DATA for "b", "d", & "e"  
 Δ = 5° 57' 15"  
 R = 1000.00  
 T = 52.01  
 C = 101.87  
 L = 103.92



PERMIT NO. 0-96-36  
 WILSON TUNNEL CELLULAR PHONE SITES  
 (REFER TO PERMIT PLAN FOR DETAILS)  
 COMP: 04/04/97

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHI TUNNEL**  
**KALIHI APPROACH ROAD**  
**PORTAL VICINITY DETAILS**

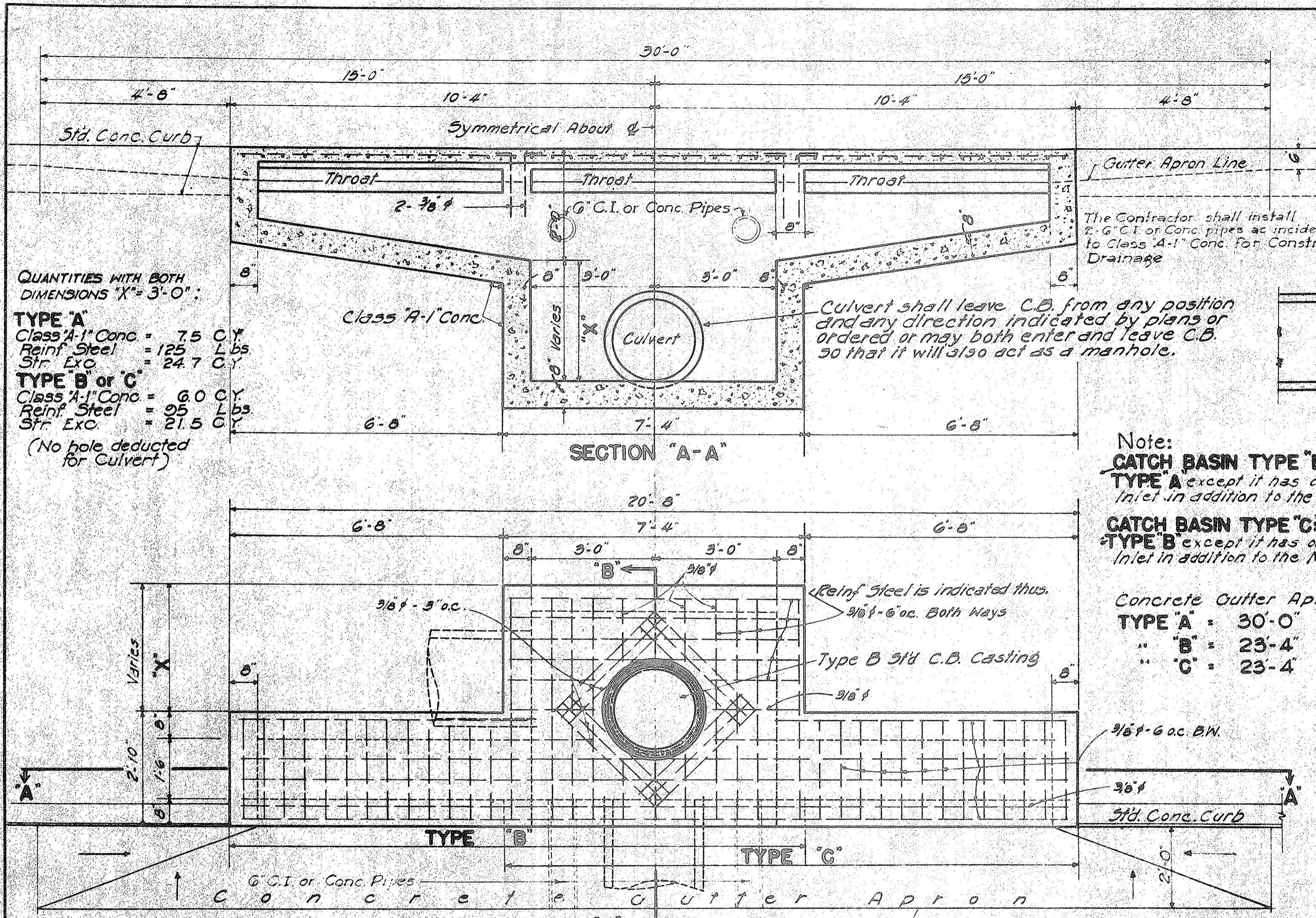
ENGINEER: S.O.W. - R.W. DATE: JULY 15, 1993  
 DRAFTSMAN: R.W. CHECKED BY: S.O.W. - R.W.  
 SCALE: AS SHOWN TRACER: J.S. - Y.N.  
 APPROVED: [Signature] APPROVED: [Signature]  
 CHIEF ENGINEER BUREAU ENGINEER

SECTION C JOB NO. 26-53 DWG. R-4

Sheet No. 13 of 252 Sheets

NOTE: Azimuths shown are based on meridian thru & Kailua.





QUANTITIES WITH BOTH DIMENSIONS "X" = 3'-0"

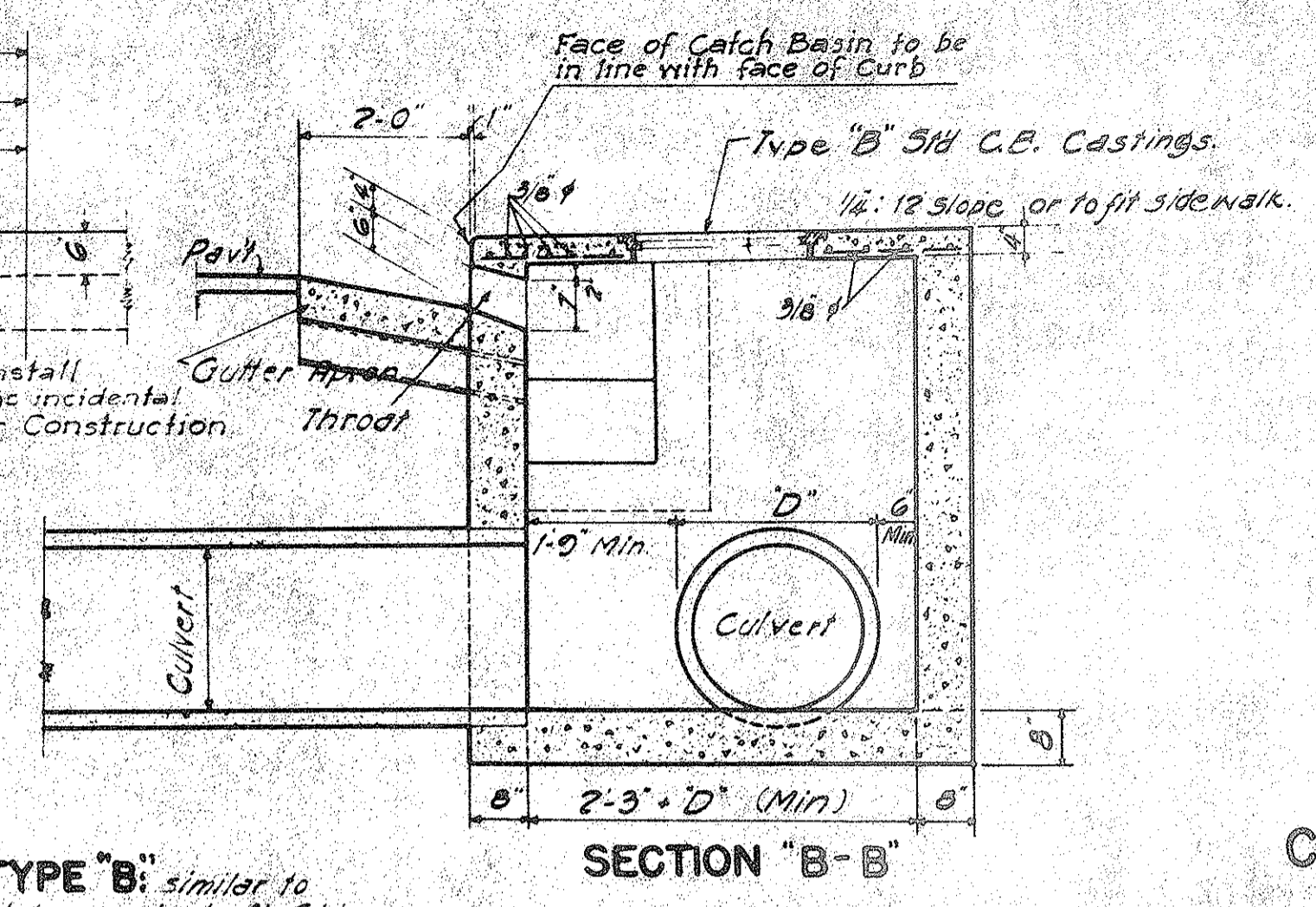
**TYPE A**  
 Class A-1 Conc. = 7.5 Cu. Yds.  
 Reinf. Steel = 125 Lbs.  
 Str. Exc. = 24.7 Cu. Yds.

**TYPE B or C**  
 Class A-1 Conc. = 6.0 Cu. Yds.  
 Reinf. Steel = 95 Lbs.  
 Str. Exc. = 21.5 Cu. Yds.

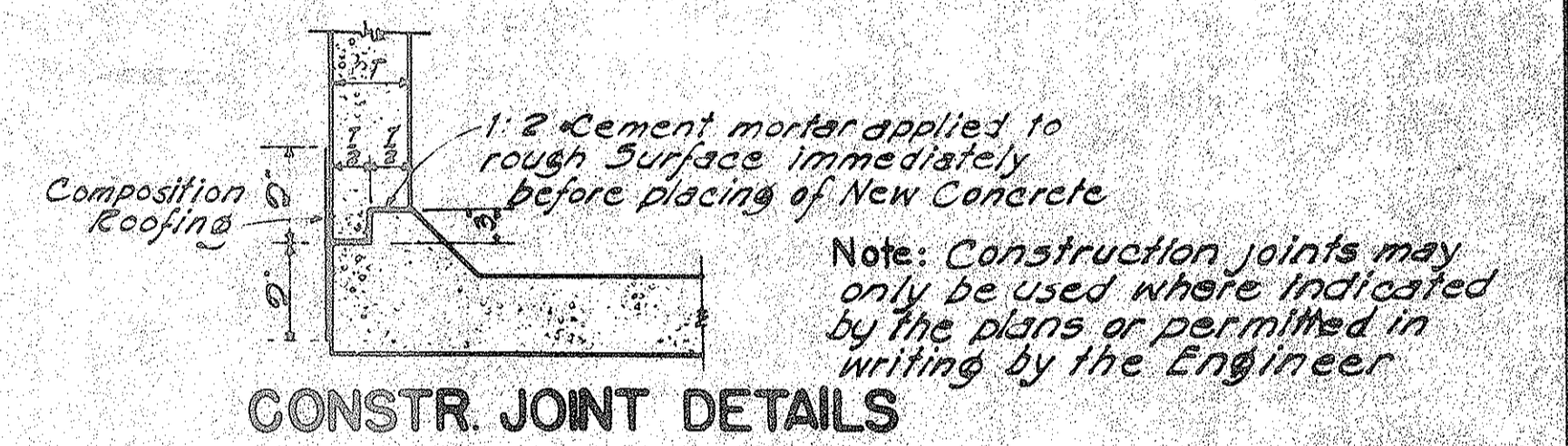
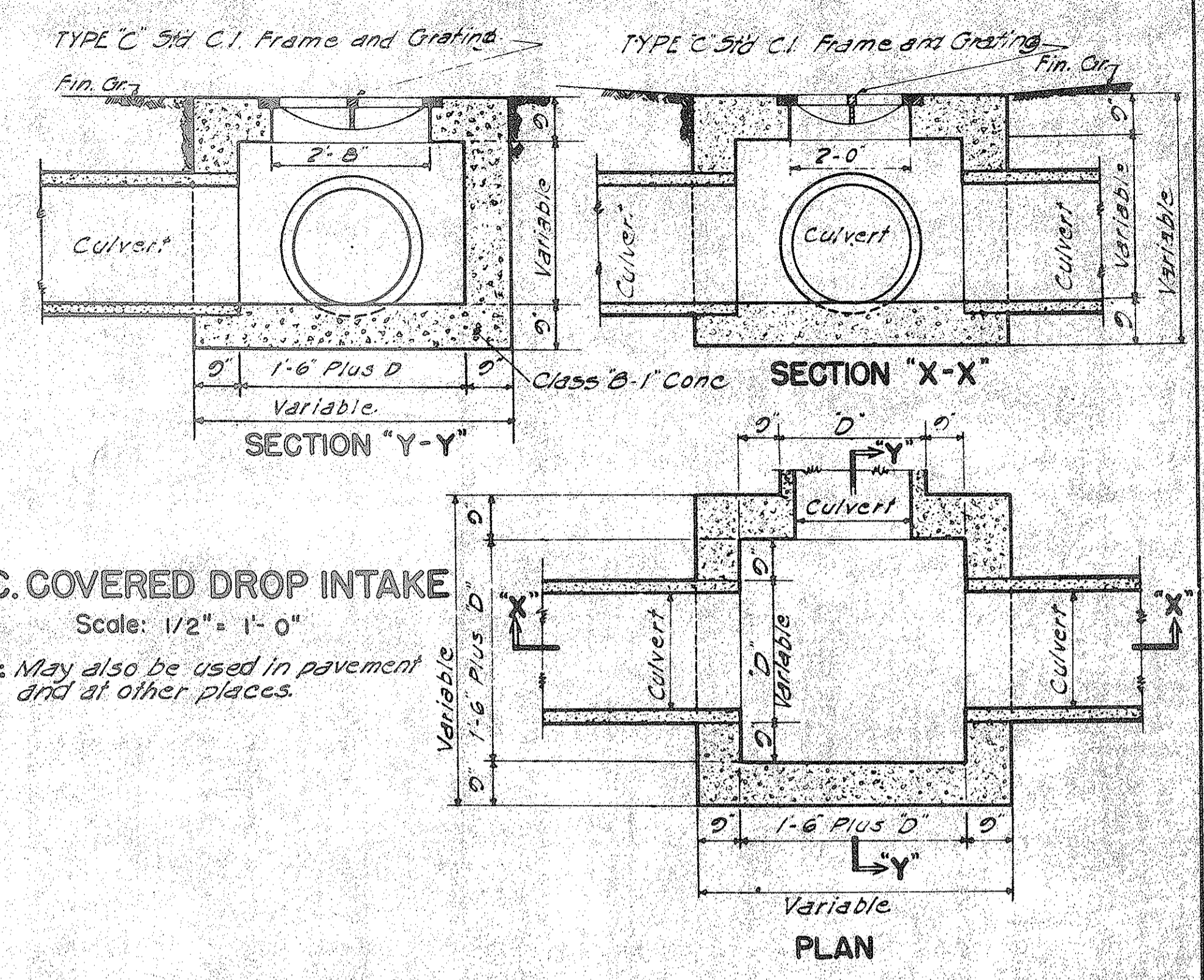
(No hole deducted for Culvert)

Note:  
**CATCH BASIN TYPE "B"** similar to **TYPE A** except it has only Left Side Inlet in addition to the Main Box.  
**CATCH BASIN TYPE "C"** similar to **TYPE B** except it has only Right Side Inlet in addition to the Main Box.

Concrete Gutter Apron Length:  
 TYPE A = 30'-0"  
 " B = 23'-4"  
 " C = 23'-4"

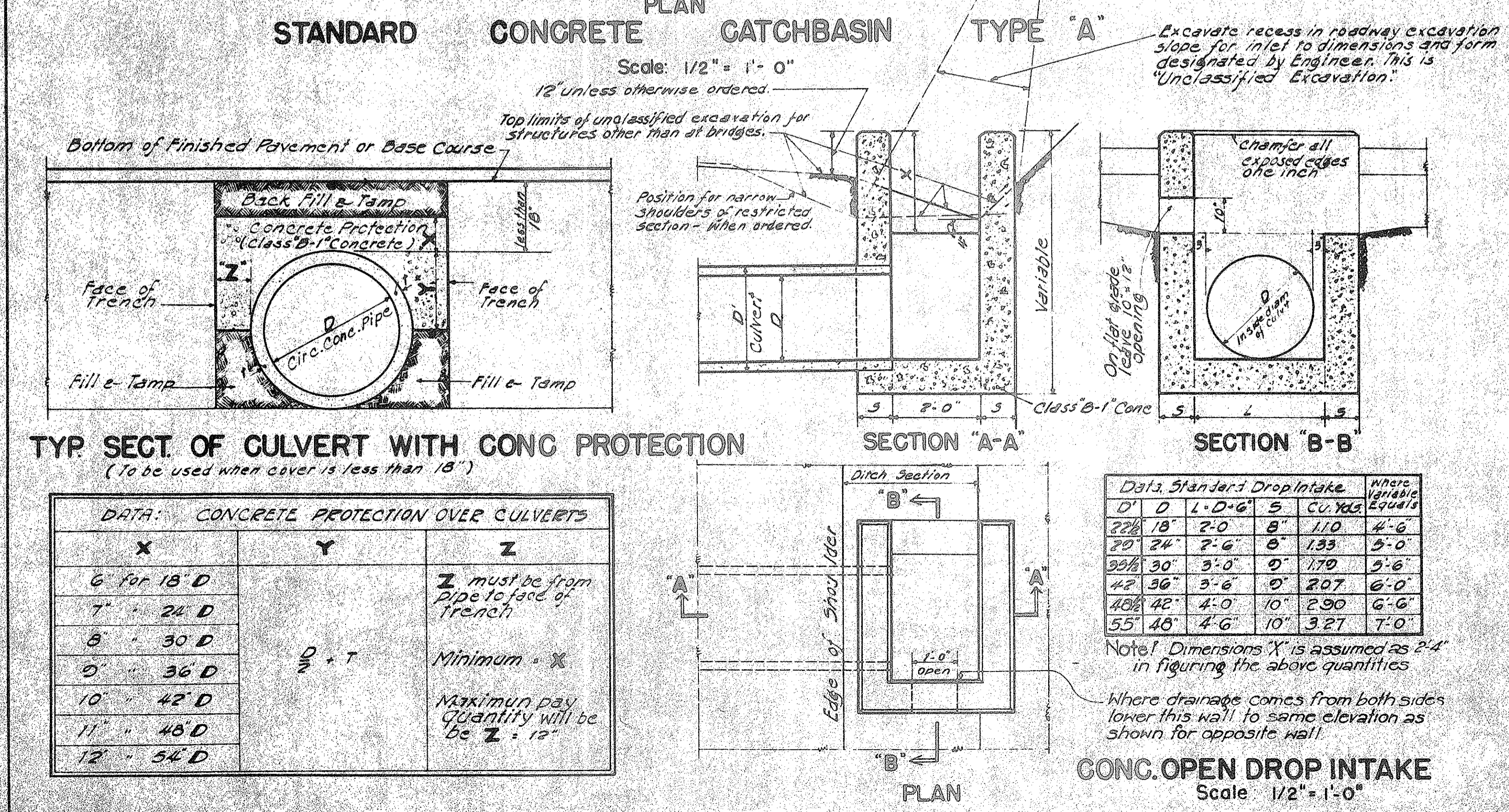


**CONC. COVERED DROP INTAKE**  
 Scale: 1/2" = 1'-0"  
 Note: May also be used in pavement and at other places.



**METHOD OF APPLYING CONSTR. JOINT WATERPROOFING**

- Map surface either side of joint as required with asphalt 80-100 penetration applied at 200°F.
- Apply one layer of 55-lb composition roofing to hot asphalt.
- Map surface of composition roofing and 3" beyond all around with thick coat of asphalt as specified under (1).



**TYP. SECT. OF CULVERT WITH CONG. PROTECTION**  
 (To be used when cover is less than 18")

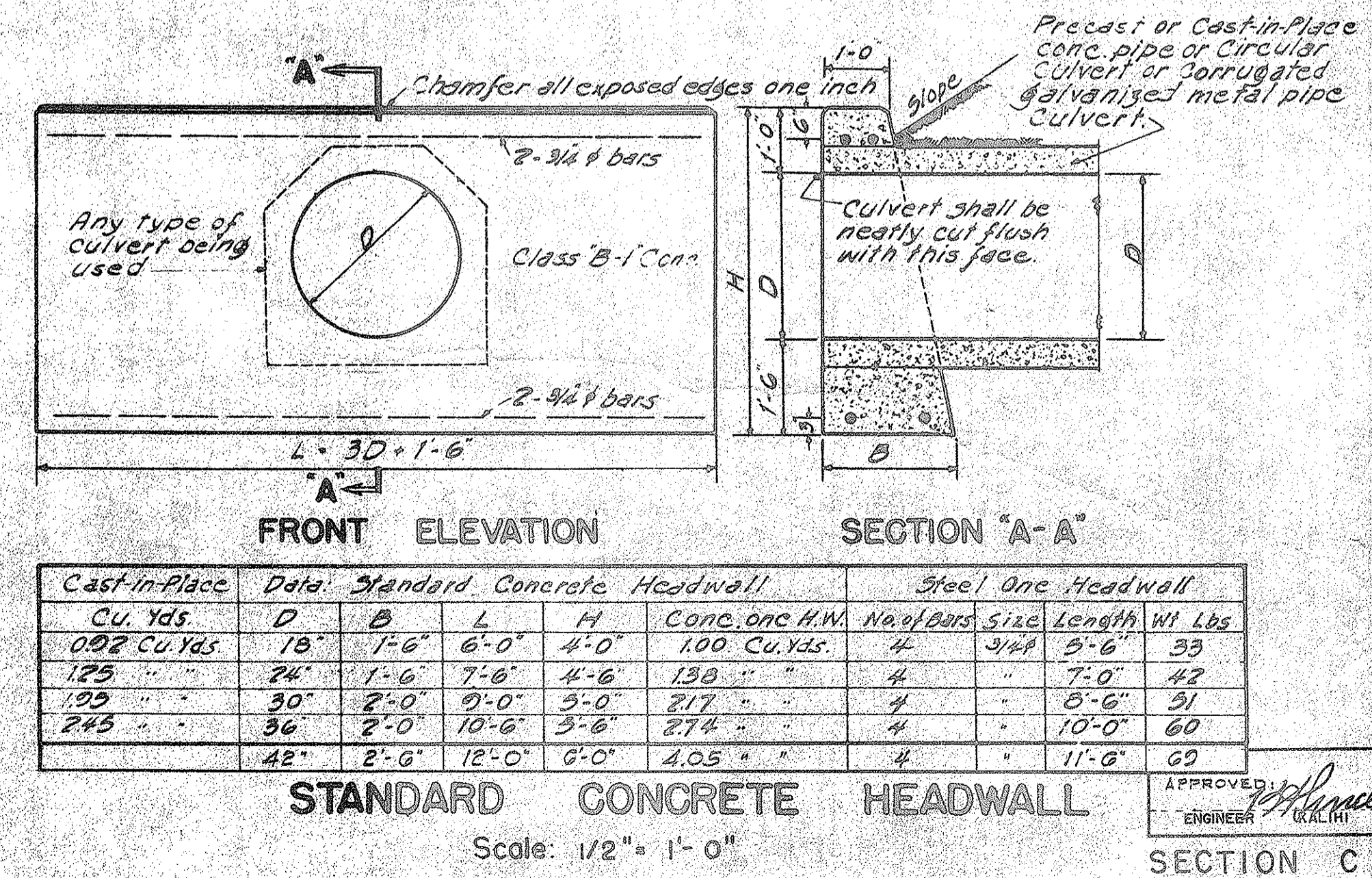
DATA: CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	D + T	Z must be from pipe to face of trench
7" - 24" D		Minimum - X
8" - 30" D		Maximum - Y
10" - 42" D		
11" - 48" D		
12" - 54" D		

**DATA, Standard Drop Intake**

D	L	S	Cu. Yds.	Where Variable Equals
22 1/2	18	2'-0"	110	4'-6"
27	24	2'-6"	133	5'-0"
32 1/2	30	3'-0"	170	5'-6"
42	36	3'-6"	207	6'-0"
48 1/2	42	4'-0"	290	6'-6"
55	48	4'-6"	327	7'-0"

Note: Dimensions Y is assumed as 2'-4" in figuring the above quantities

Where drainage comes from both sides lower this wall to same elevation as shown for opposite wall



**STANDARD CONCRETE HEADWALL**  
 Scale: 1/2" = 1'-0"

Cast-in-Place Cu. Yds.	Data: Standard Concrete Headwall				Steel One Headwall				
	D	B	L	H	Conc. one H.W.	No. of Bars	Size	Length	WT Lbs
0.92	18	1'-6"	6'-0"	4'-0"	100 Cu. Yds.	4	3/4"	5'-6"	33
1.25	24	1'-6"	7'-0"	4'-6"	130 "	4	"	7'-0"	42
1.95	30	2'-0"	9'-0"	5'-0"	217 "	4	"	8'-6"	51
2.45	36	2'-0"	10'-6"	5'-6"	274 "	4	"	10'-0"	60
	42	2'-6"	12'-0"	6'-0"	4.05 "	4	"	11'-6"	69

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHI TUNNEL**  
 APPROACH ROADS  
 STANDARD DETAILS

ENGINEER: J. H. Hwy. Dept.  
 DRAFTSMAN: [Signature]  
 SCALE: As Shown  
 APPROVED: [Signature]  
 CHIEF ENGINEER: [Signature]

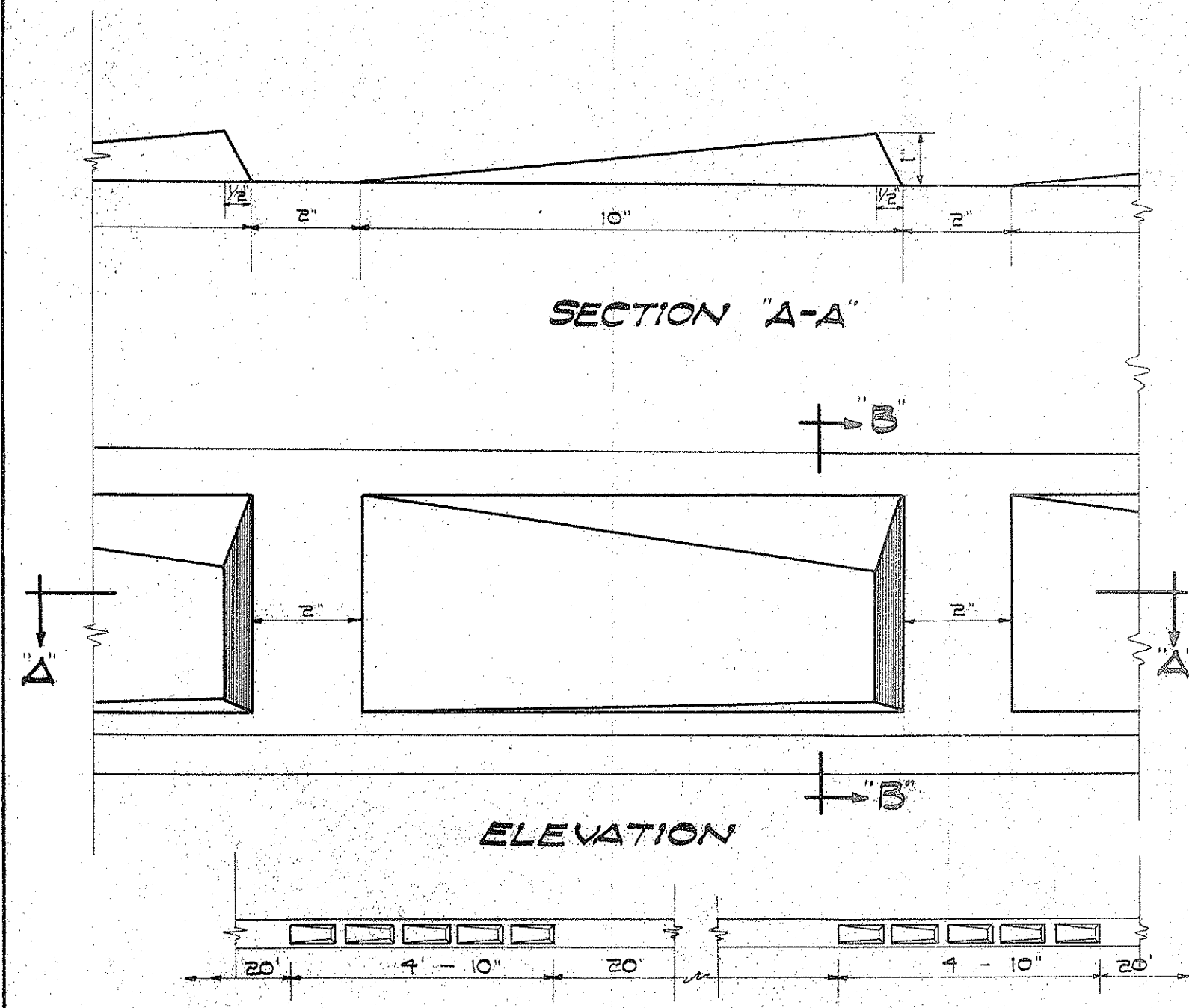
DATE: July 15, 1953  
 CHECKED BY: [Signature]  
 APPROVED: [Signature]  
 BUREAU ENGINEER: [Signature]

W. S. [Signature] PROFILE C. B.  
 GR. SEC. F. S. S. B.  
 W. H. BY F. W. BY

SECTION C JOB NO. 26-53 DWG. R-5



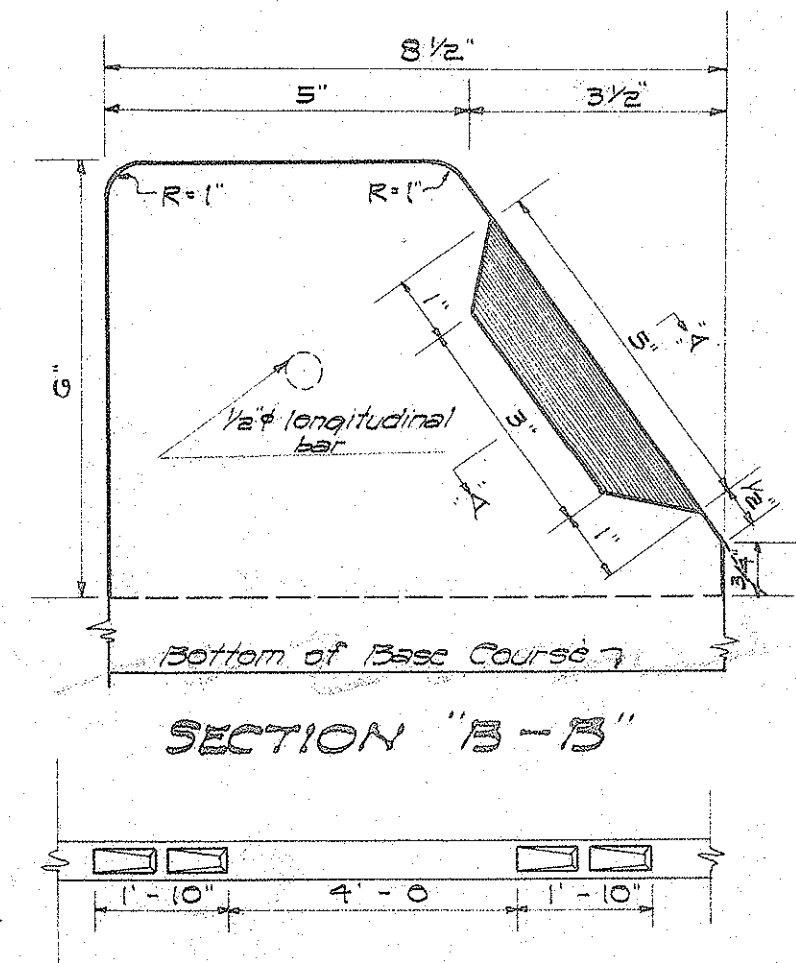
NOTE: Shaded area to be painted with an approved white lacquer.



RECESS SPACING FOR TYPE "A"  
Scale: 3/8" = 1'-0"

TYPE "A": This type and spacing of recesses to be used where medians are curbed continuously.

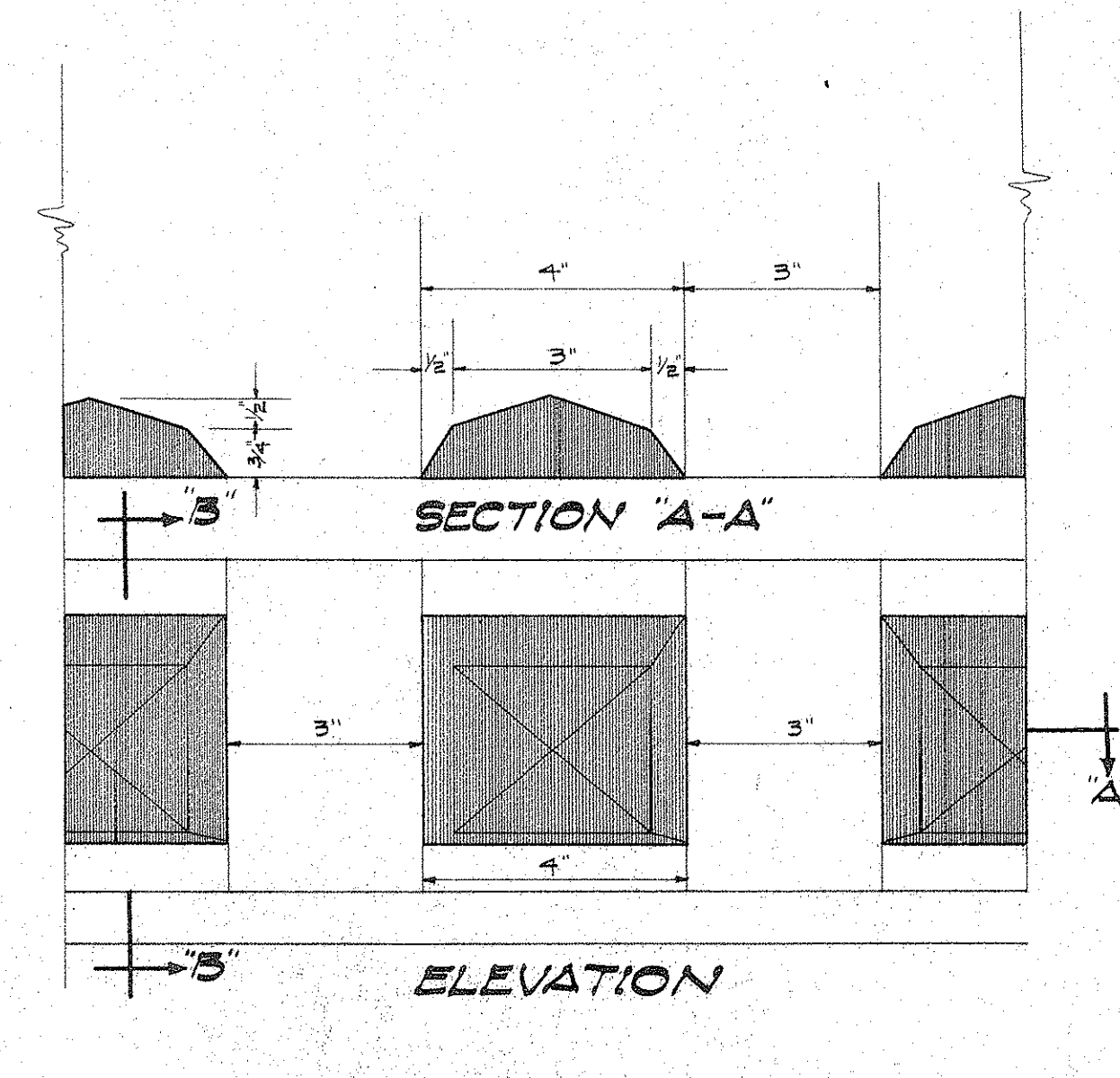
MEDIAN - STRIP CURB TYPE "A"  
Scale: 3/8" = 1'-0"



RECESS SPACING FOR TYPE "B"

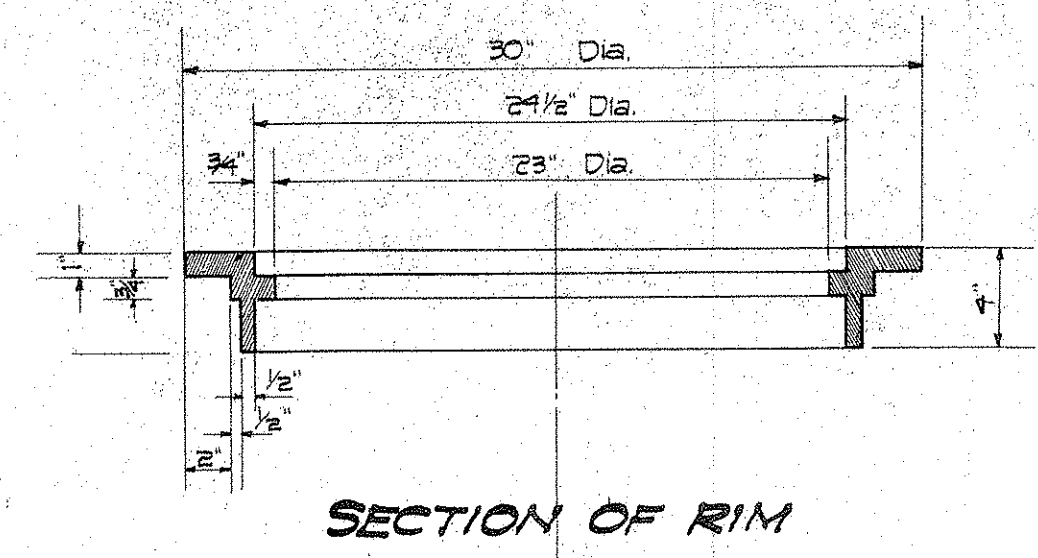
TYPE "B": This type and spacing of recesses to be used on islands at inter-sections.

NOTE: Section for type "B" curb identical to type "A" curb, however layouts as shown.

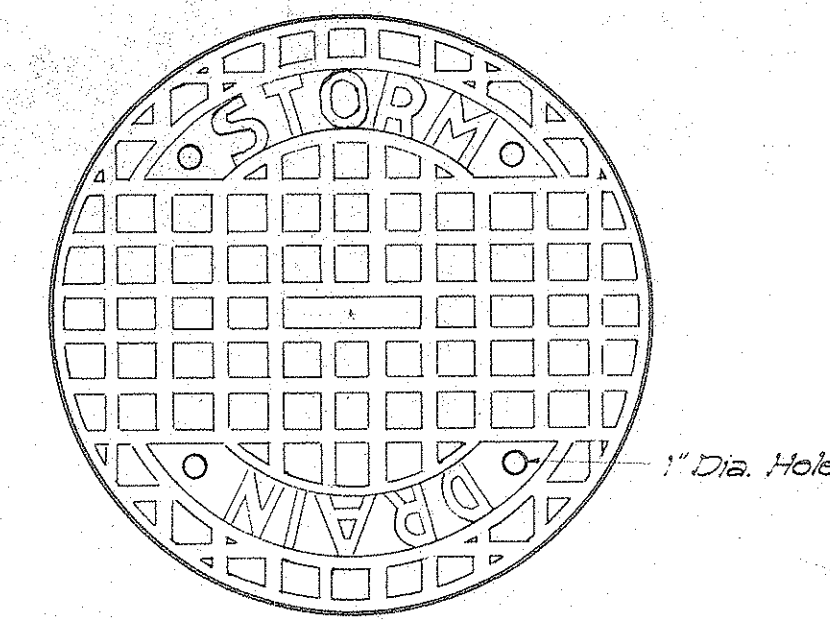


This type and spacing of recesses to be used on curb returns.

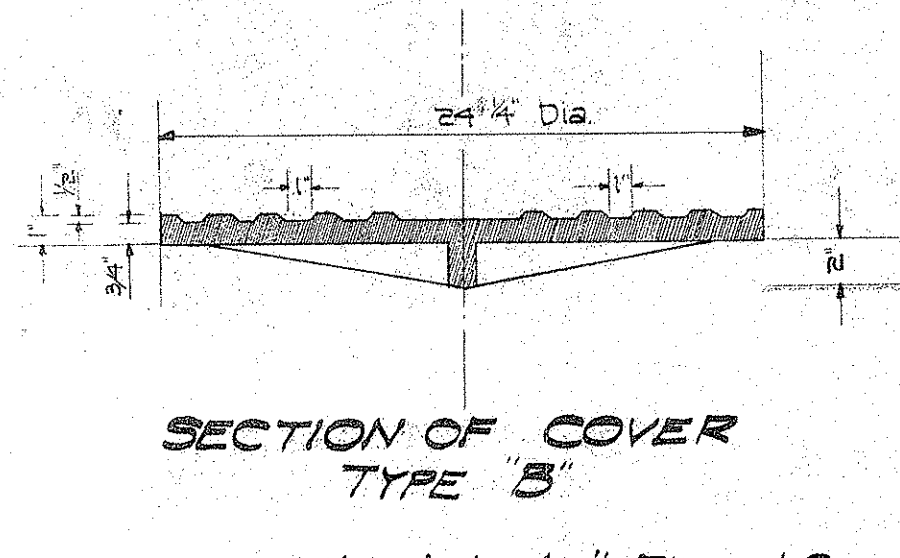
MEDIAN - STRIP CURB FOR RETURNS  
Scale: 3/8" = 1'-0"



SECTION OF RIM

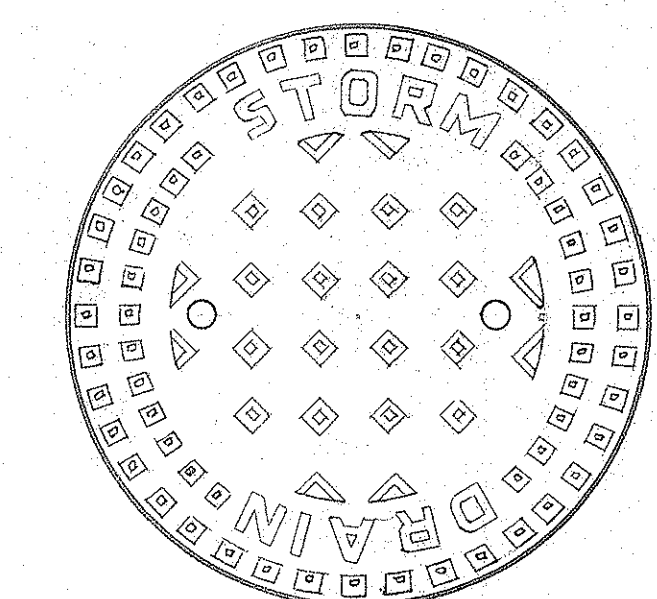


PLAN OF COVER TOP

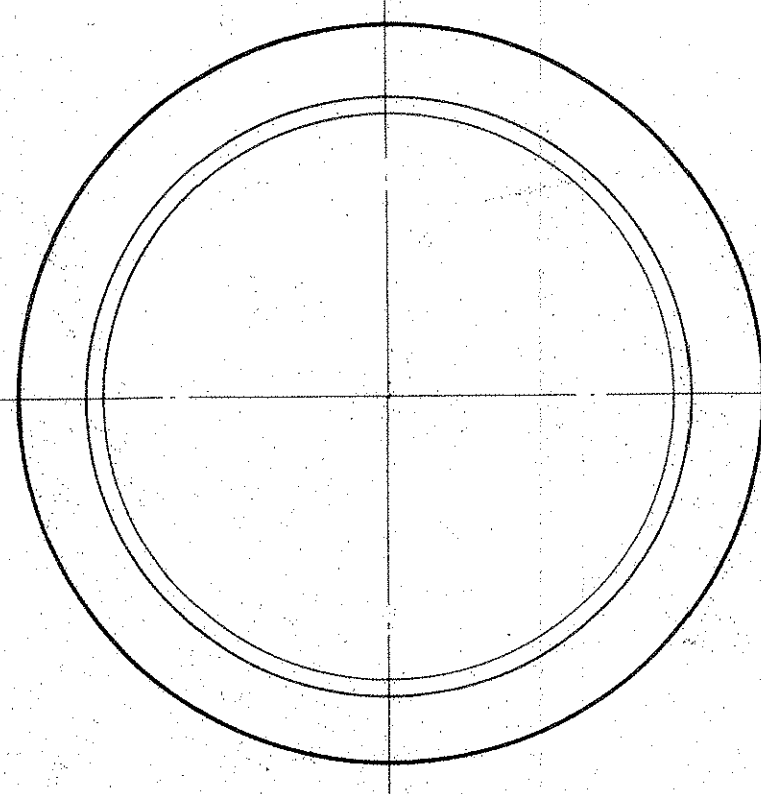


SECTION OF COVER TYPE "B"

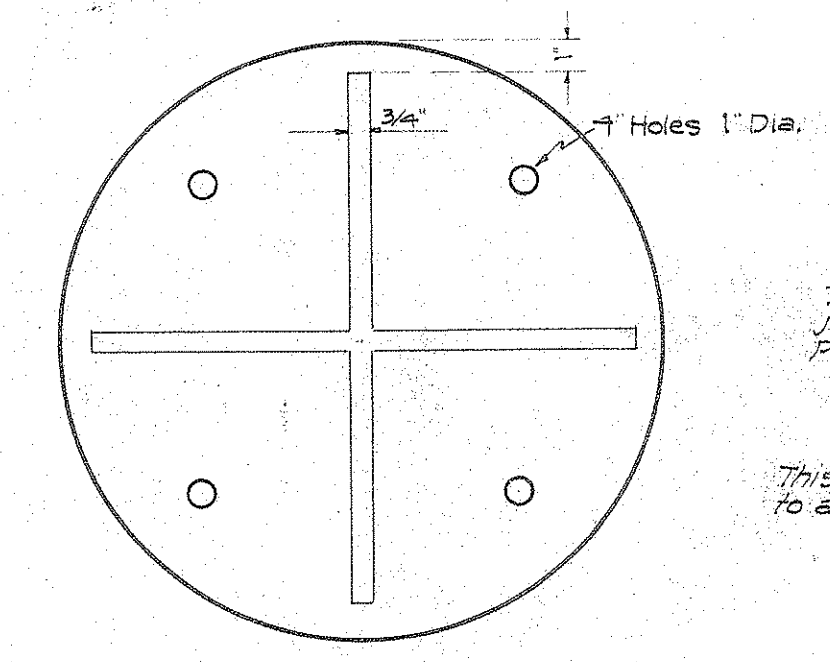
NOTE: A unit includes both Rim and Cover



TYPE "A" PATTERN FOR MANHOLE COVER

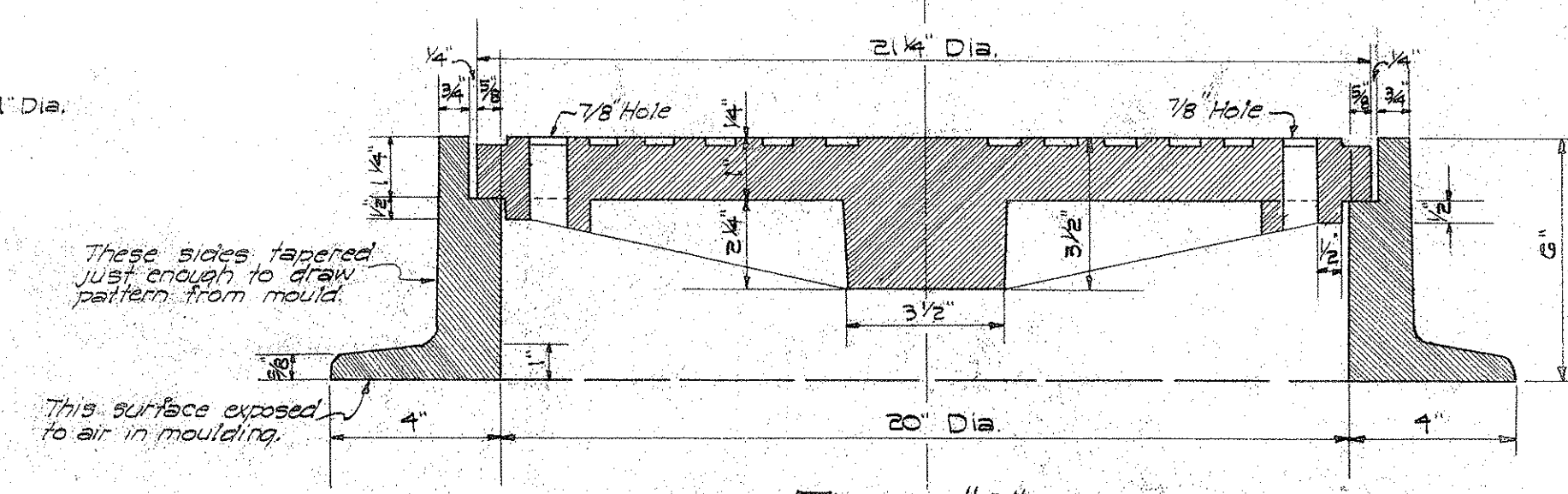


PLAN OF RIM

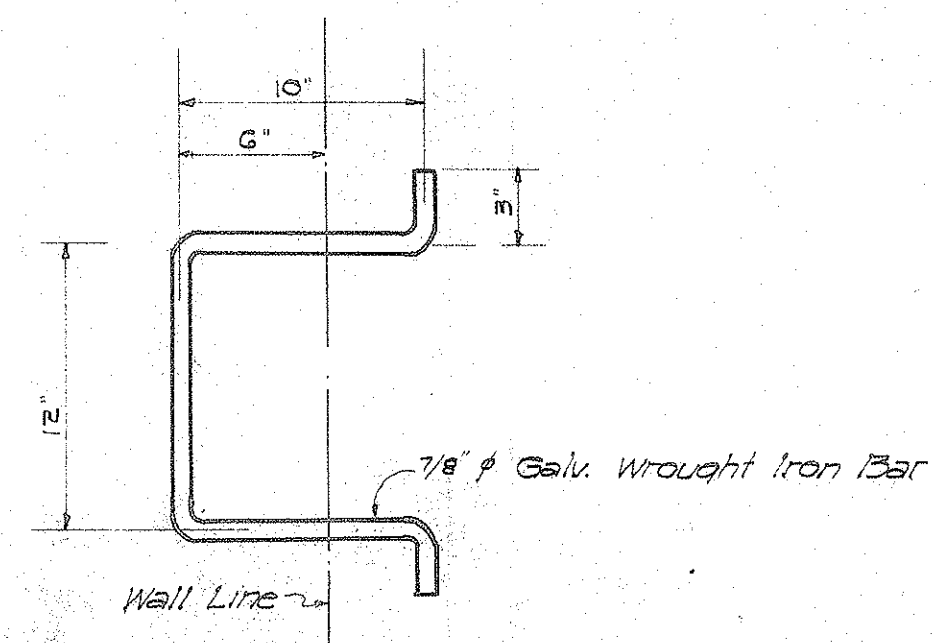


BOTTOM VIEW OF COVER

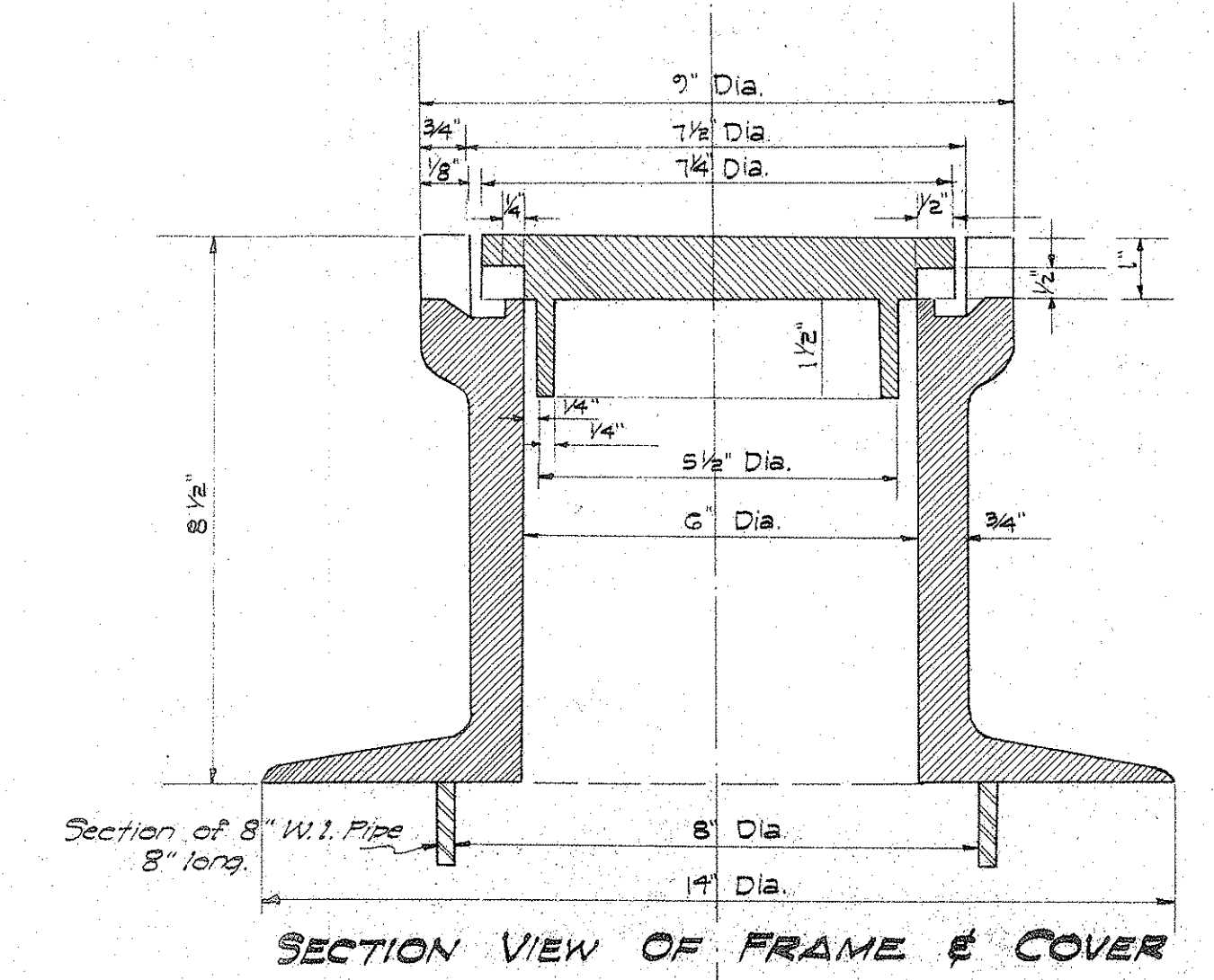
TYPE "B" STANDARD CATCH-BASIN CASTINGS  
Scale: 1/2" = 1'-0"



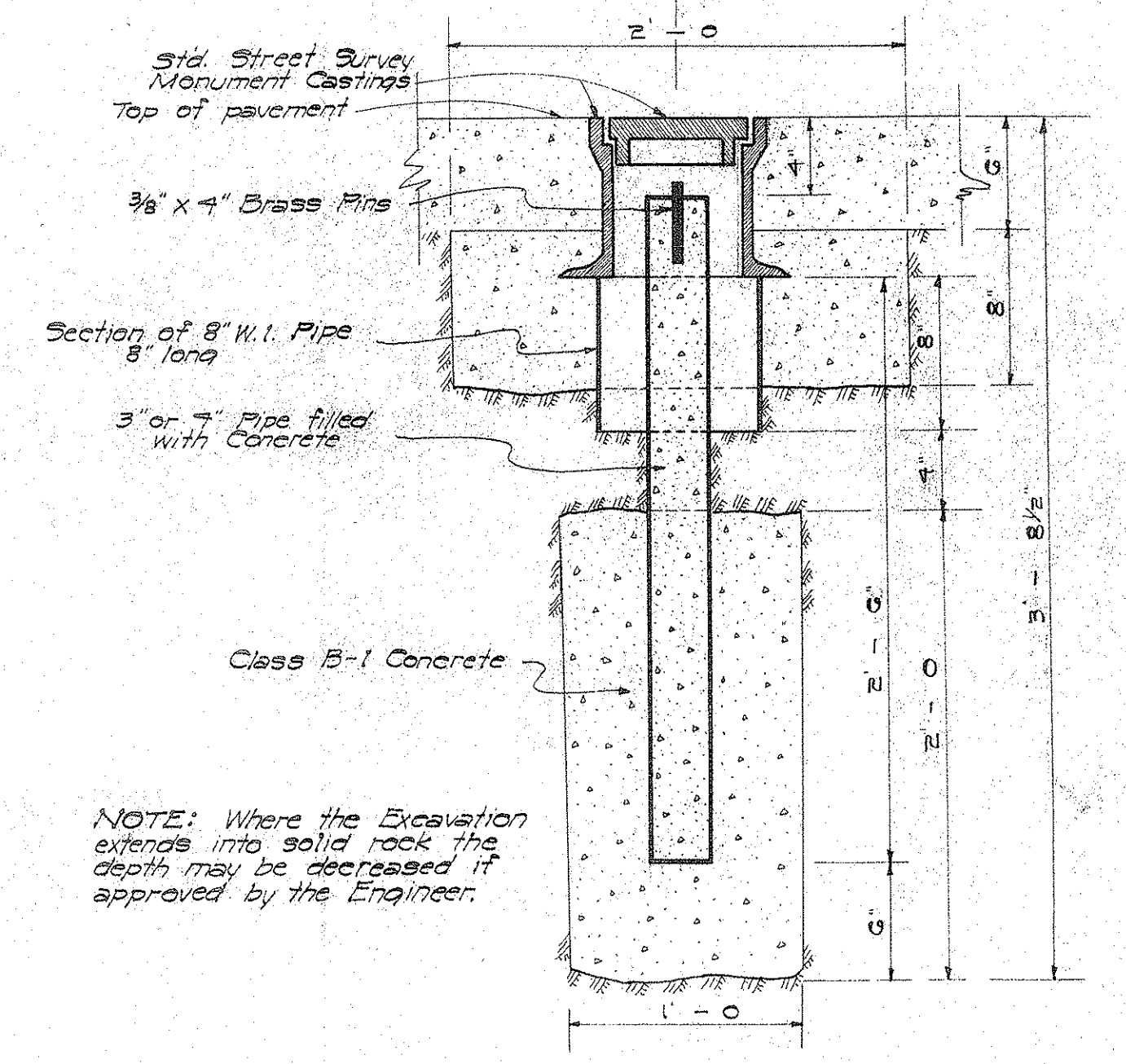
TYPE "A" STANDARD MANHOLE FRAME & COVER  
Scale: 5/8" = 1'-0"



DETAIL OF MANHOLE RUNG  
Scale: 1/2" = 1'-0"



SECTION VIEW OF FRAME & COVER



DETAIL OF STREET SURVEY MONUMENT  
Scale: 1/2" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
APPROACH ROADS  
STANDARD DETAILS

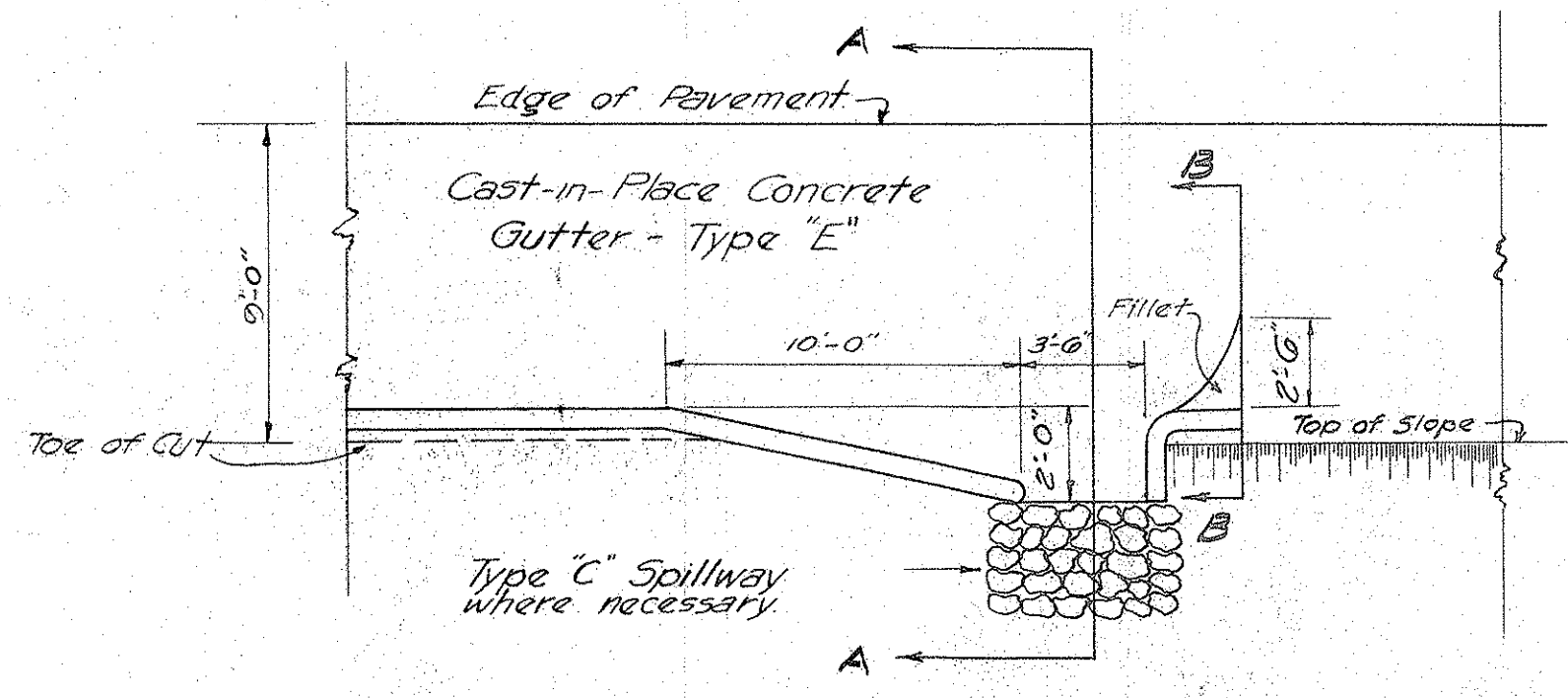
ENGINEER S.O.H. DATE July 15, 1953  
DRAFTSMAN J.N.S. CHECKED BY S.O.H.  
SCALE As Shown TRACER J.N.S.  
APPROVED: [Signature] APPROVED: [Signature]  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. SEC.	F. S.	S. B.
W. M. BY	F. W. BY	S. BY

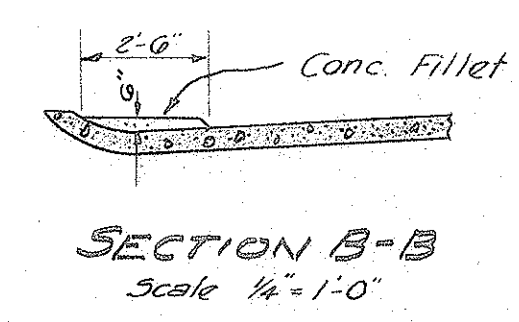
SECTION C JOB NO. 26-53 DWG. R-6

Sheet No. 15 of 252 Sheets



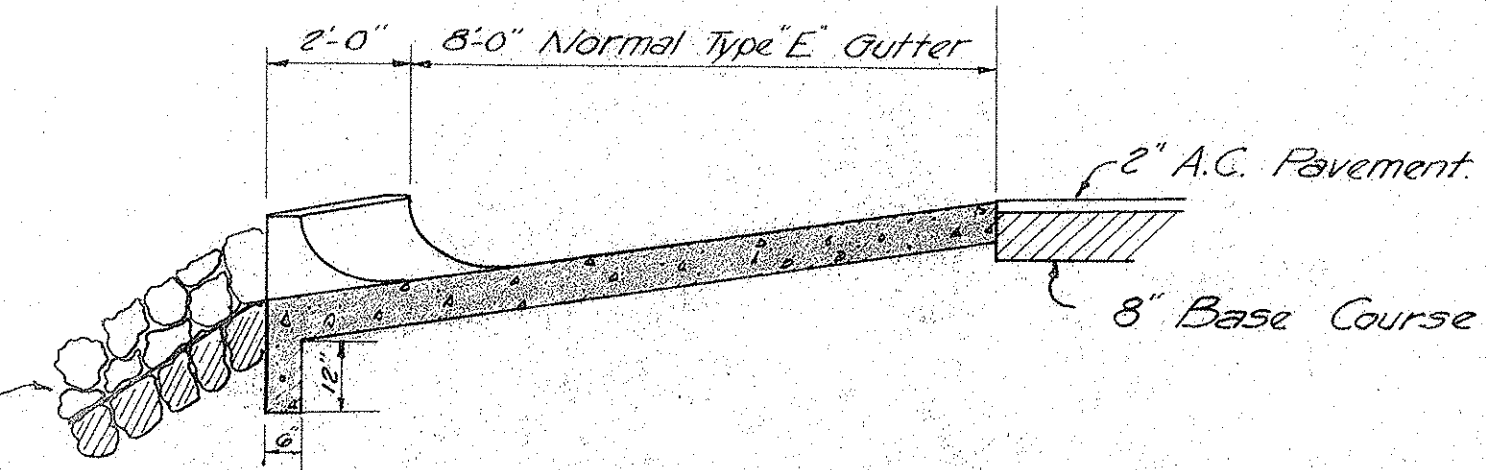


**PLAN**  
Scale: 3/8" = 1'-0"



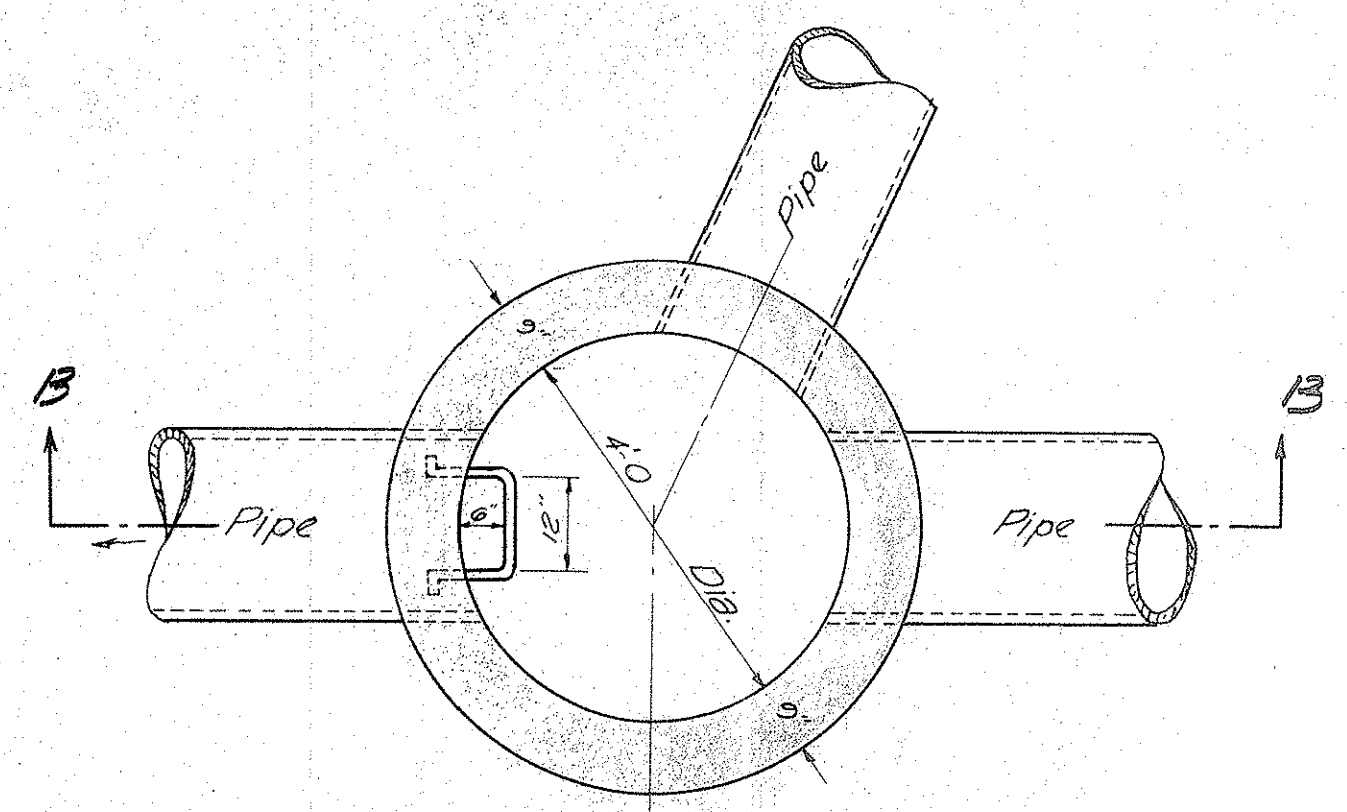
**SECTION B-B**  
Scale: 1/4" = 1'-0"

Type C Spillway where necessary

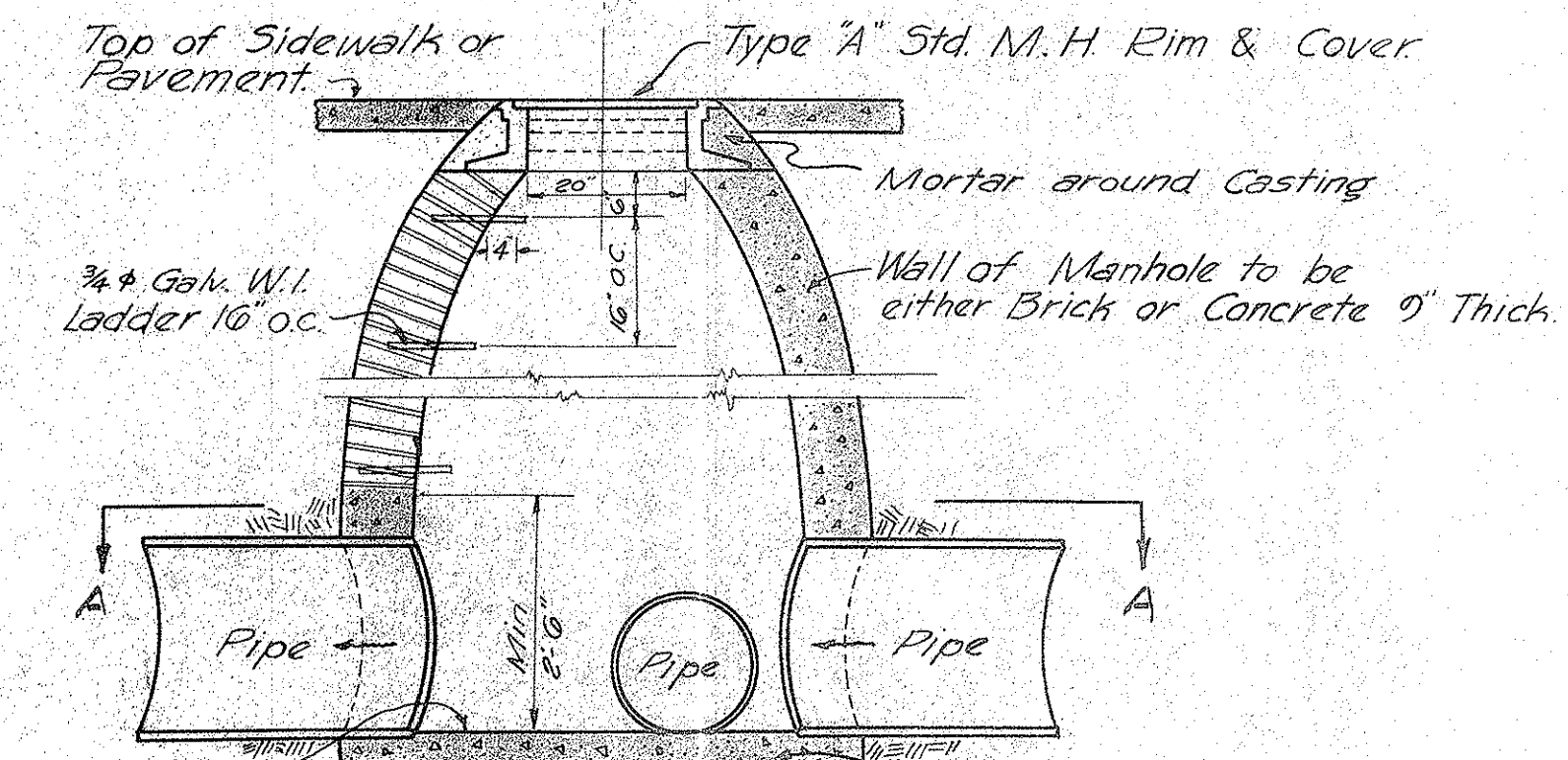


**SECTION A-A**  
Scale: 3/8" = 1'-0"

**DETAIL OF TYPICAL SPILLWAY TYPE "A"**  
Scales As Noted.



**PLAN SECTION A-A**

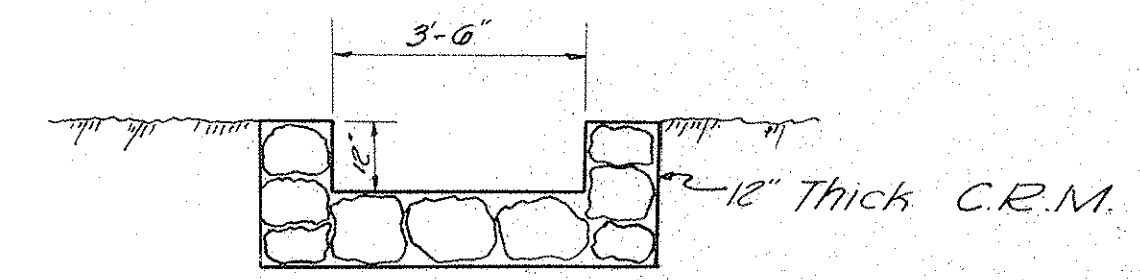


**SECTION B-B**

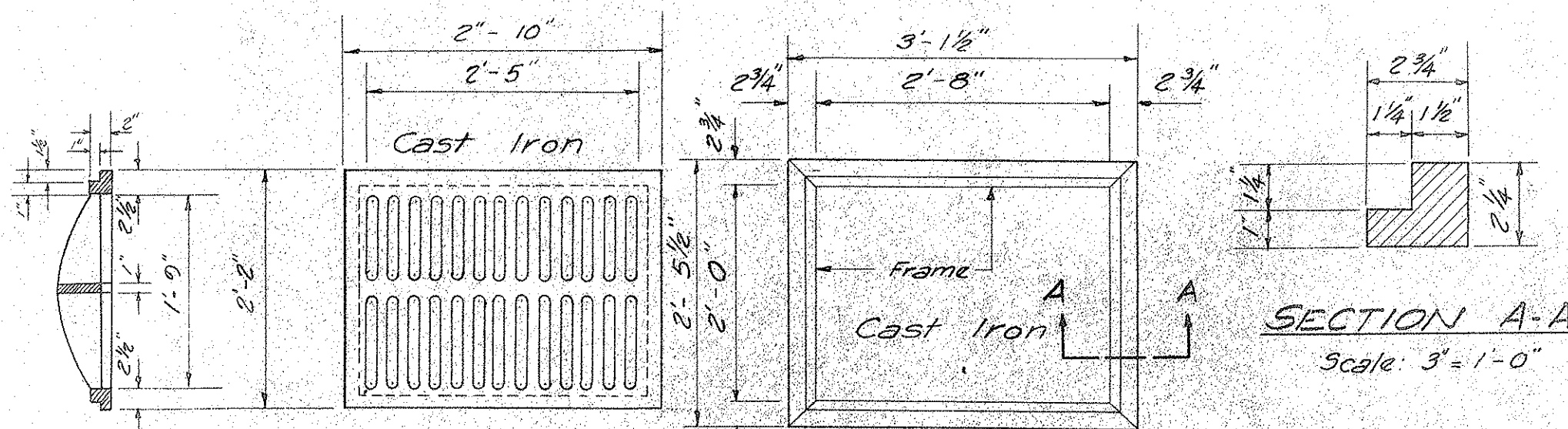
**STORM DRAIN MANHOLE**  
Scale: 1/2" = 1'-0"

Bottom to be sloped so that no water will stand in any part.

Bottom to be of concrete with 3-1/2" Bars 12" o.c. both ways.



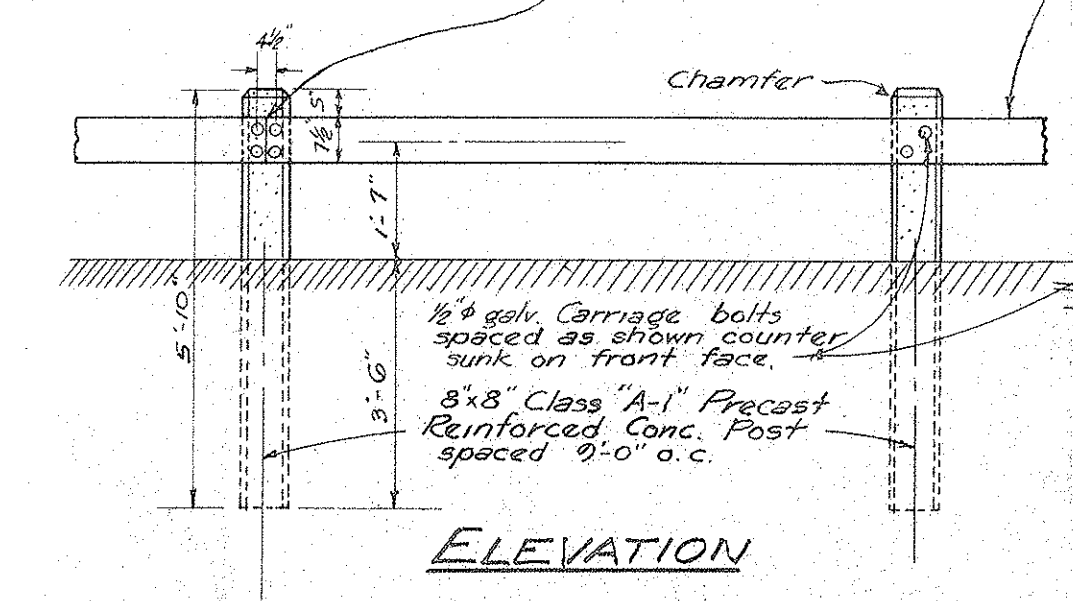
**TYPICAL SPILLWAY TYPE "C"**  
Scale: 3/8" = 1'-0"



**STANDARD C.I. FRAME AND GRATE TYPE "C"**  
Scale: 3/4" = 1'-0"

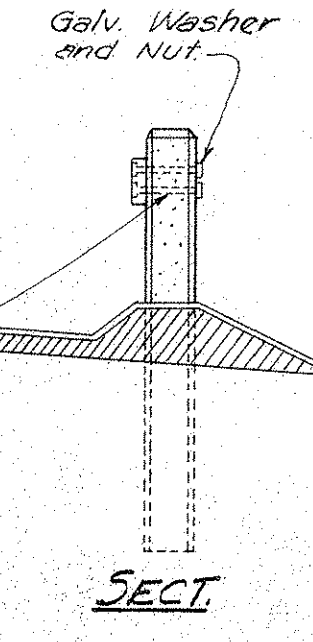
NOTE: Stock Pattern from Novelty Foundry - Honolulu

4"x8"x18'-0" 545 Railing painted 3 coats of white paint. Contact surfaces between posts and rail and all butt joints shall be painted 3 coats before assembly.  
Butt joints to be left open approx 1/4" and spaced every other post except on sharp curves.

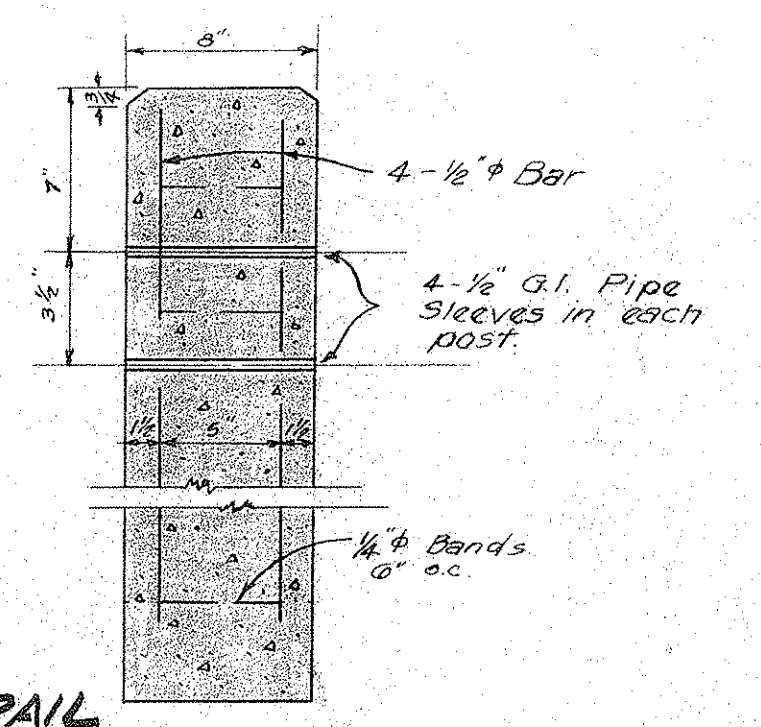


**ELEVATION**

Note: Suggest holes in rail for bolts be bored from back of post after lining up and temporarily fastening rail.



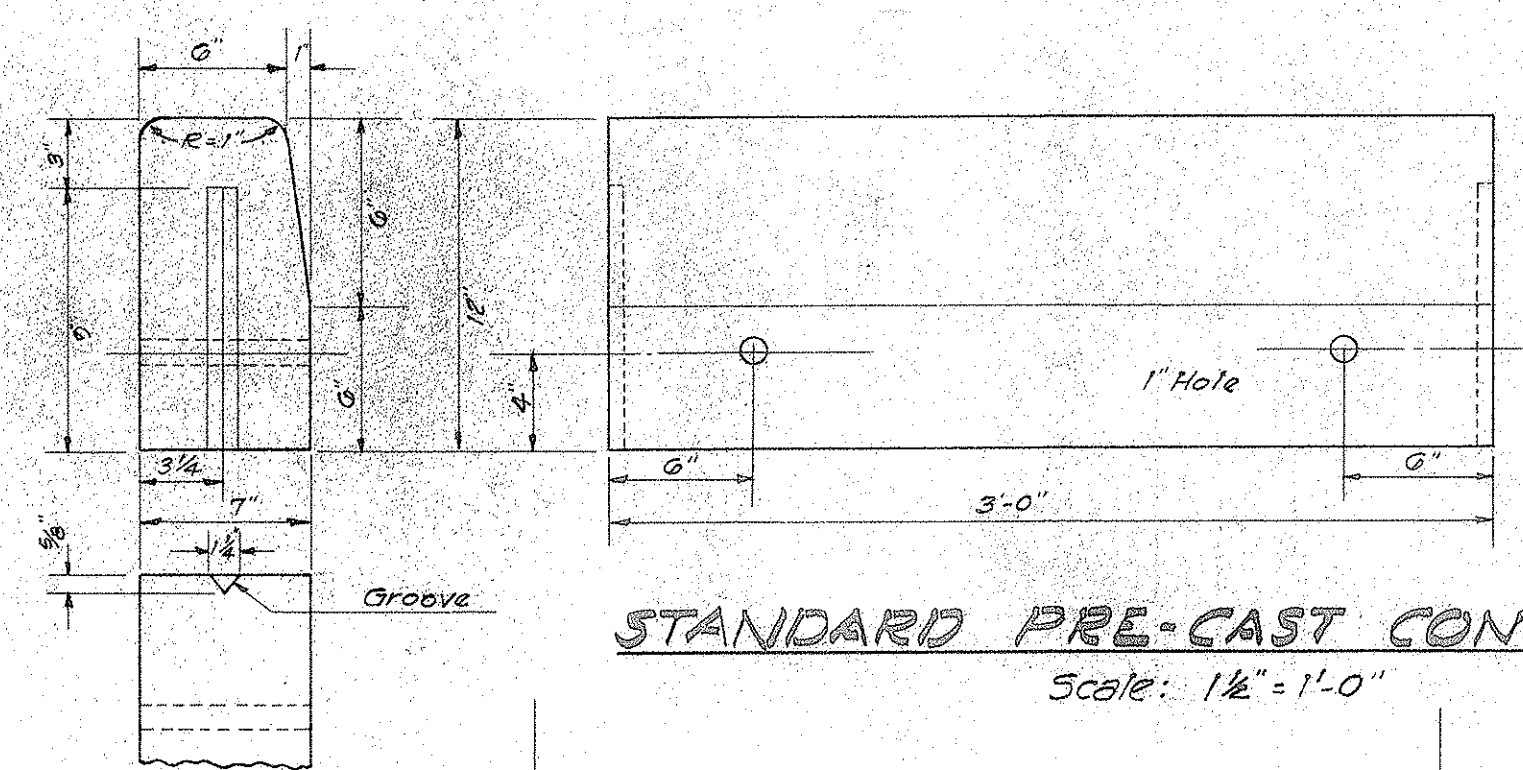
**SECT**



**PLAN SECT**

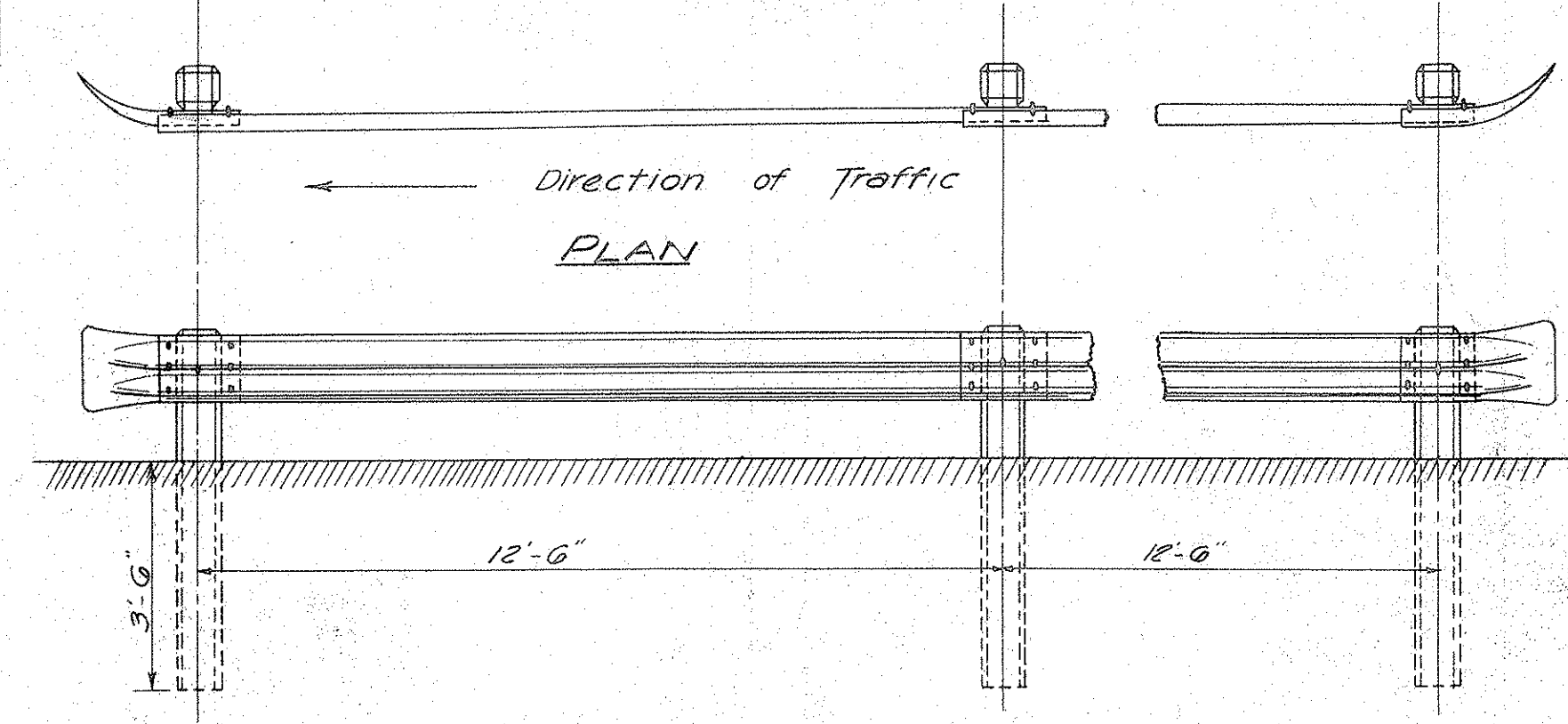
**STANDARD WOOD GUARD RAIL**  
Scale: 3/8" = 1'-0"

**SECT. THRU CONC. POST**  
Scale: 1/4" = 1'-0"

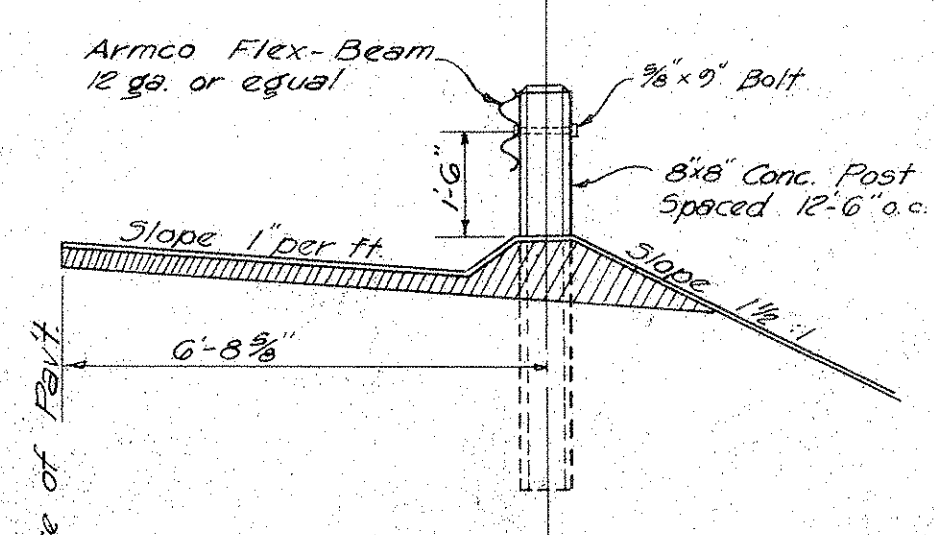


**STANDARD PRE-CAST CONC. CURB TYPE "G"**  
Scale: 1/2" = 1'-0"

Note: Dimensions shown in parentheses are for 12" Curbs.

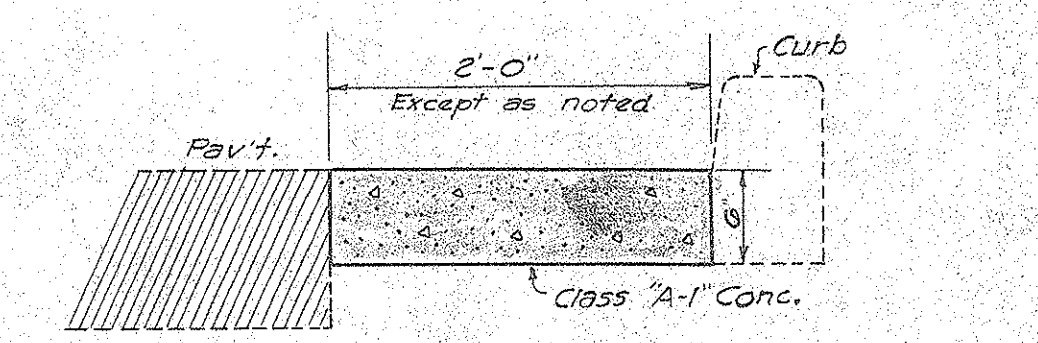


**ELEVATION**



**SECTION**

**METAL GUARDRAIL**  
Scale: 3/8" = 1'-0"



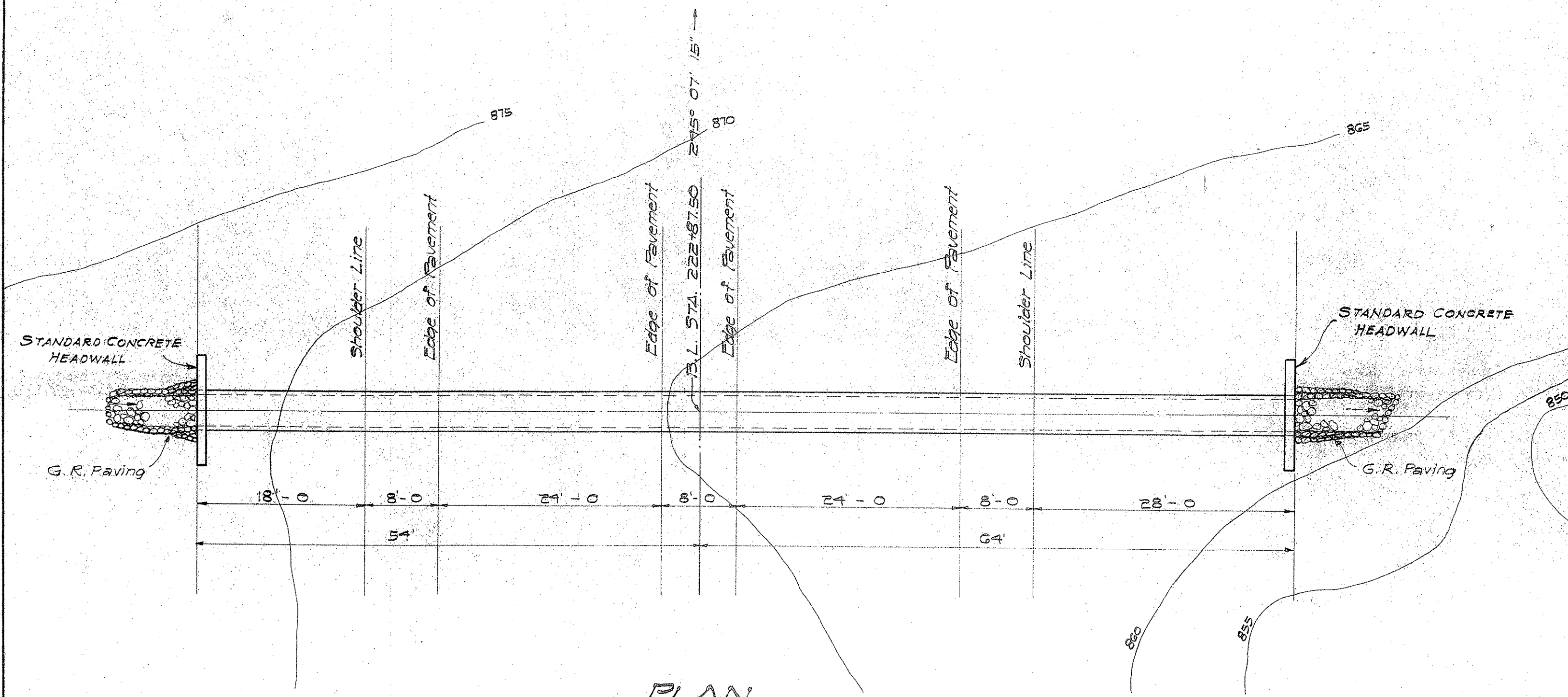
**TYPICAL SECT. TYPE "G" GUTTER**  
Scale: 1" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHI TUNNEL**  
APPROACH ROADS  
STANDARD DETAILS

ENGINEER: S.O.H.-R.W. DATE: JULY 18, 1953  
DRAFTSMAN: G.I. CHECKED BY: S.O.H.-R.W.  
SCALE: AS SHOWN TRACER: G.I.  
APPROVED: [Signature] APPROVED: [Signature]  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. REC.	F. B.	S. B.
W. M. BY.	F. W. BY.	S. BY.

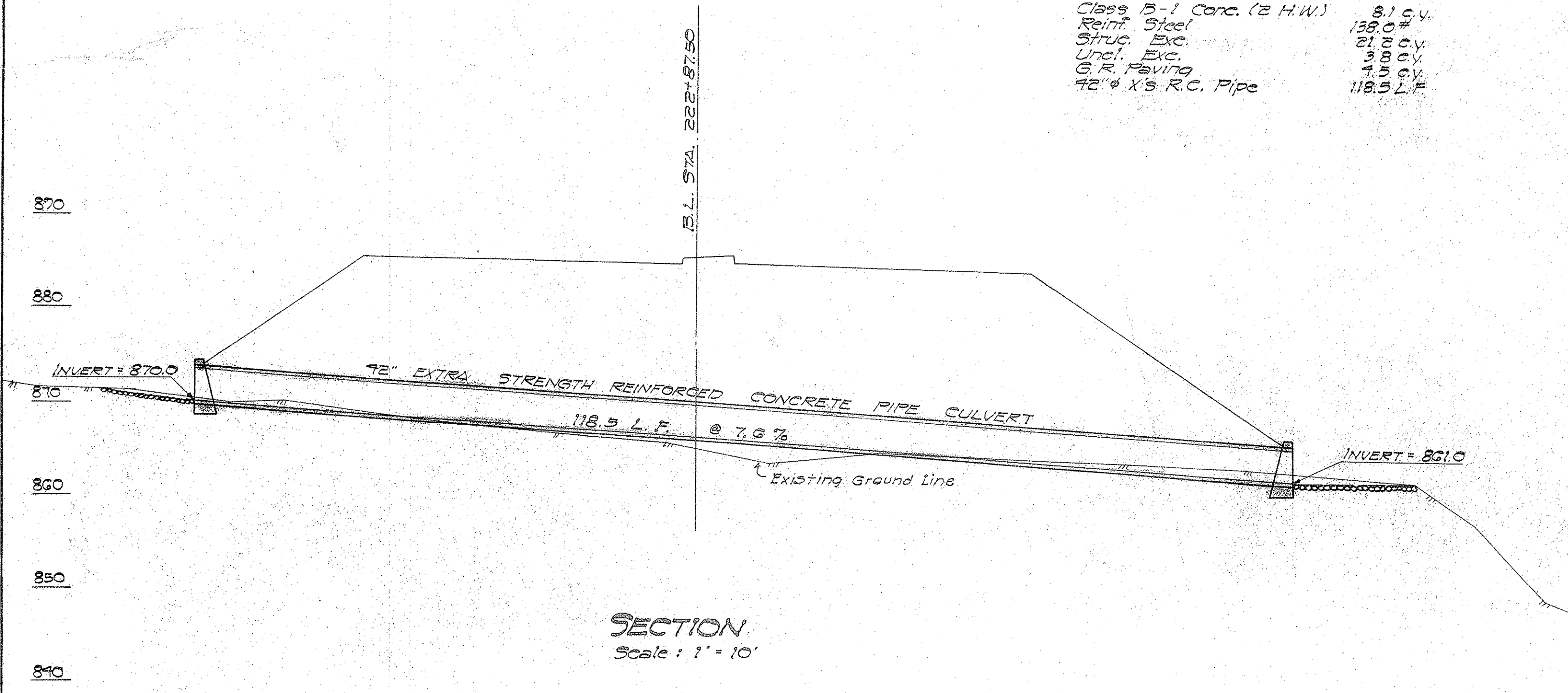




PLAN  
Scale: 1" = 10'

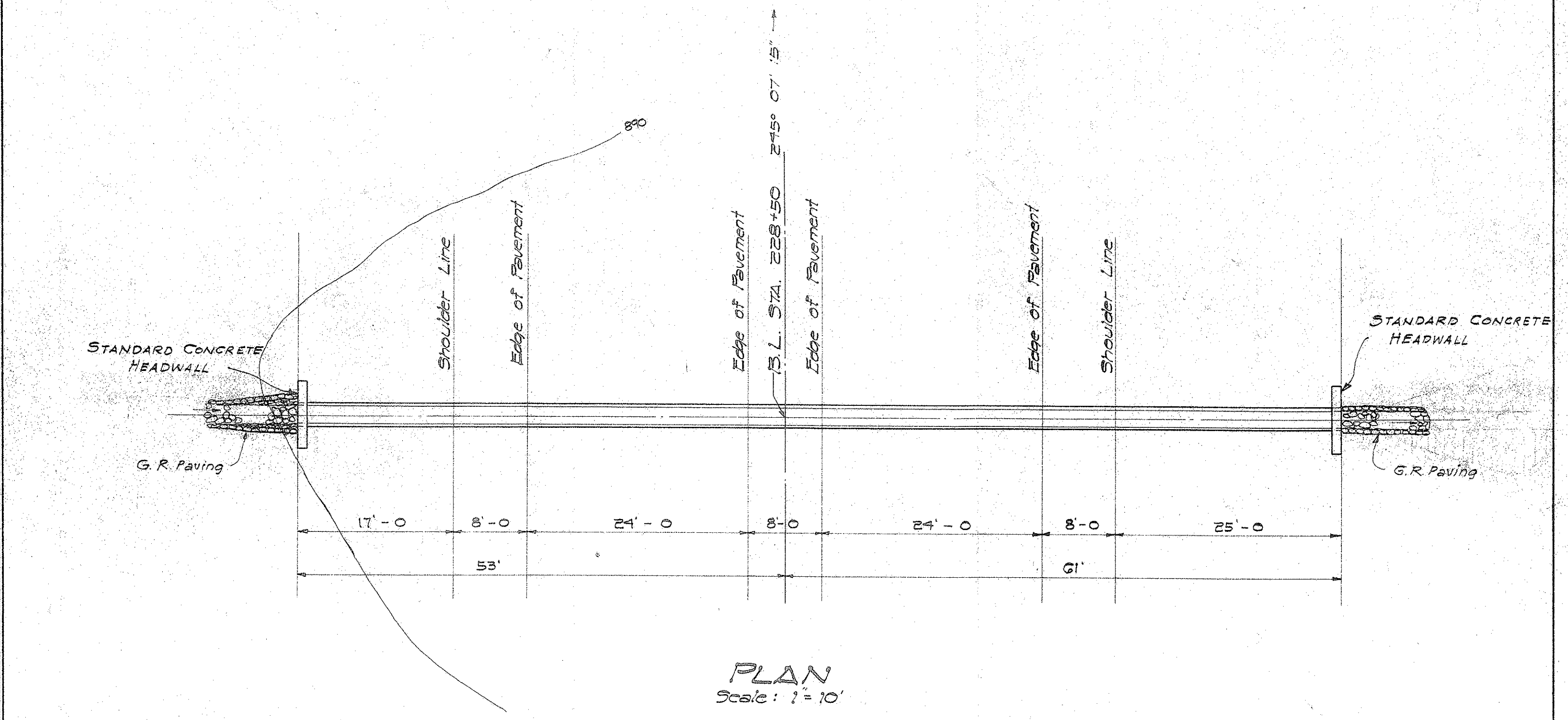
Estimated Quantities

Class B-1 Conc. (2 H.W.)	3.1 C.Y.
Reinf. Steel	130.0 #
Struc. Exc.	21.0 C.Y.
Uncl. Exc.	3.0 C.Y.
G.R. Paving	1.5 C.Y.
42" X 5' R.C. Pipe	118.5 L.F.



SECTION  
Scale: 1" = 10'

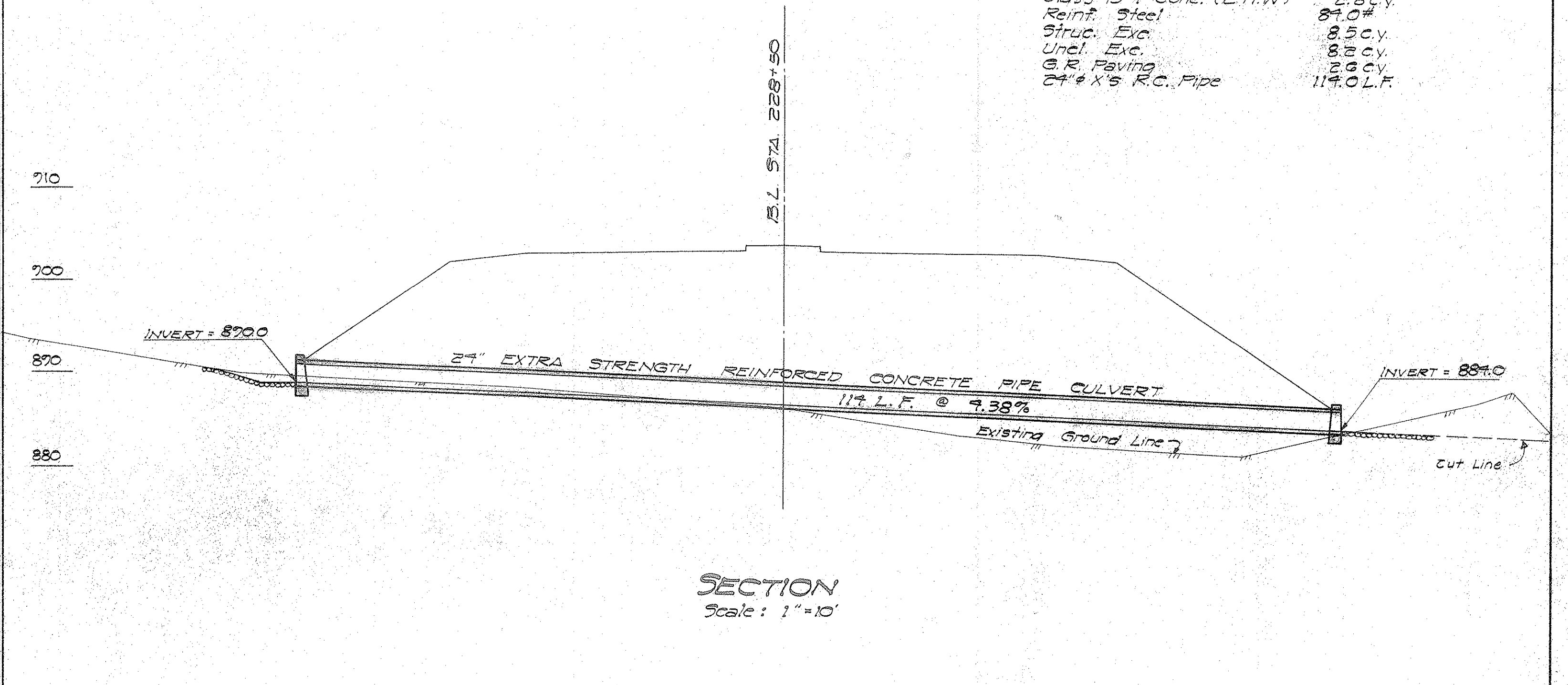
42" R.C. CULVERT AT B.L. STA. 222+87.50



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.	0.2 C.Y.
G.R. Paving	2.0 C.Y.
24" X 5' 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 SCH DATE July 15, 1953  
DRAFTSMAN J.N.S. CHECKED BY S.O.H.-R.W.  
SCALE As Shown TRACER J.N.S.  
APPROVED [Signature] APPROVED [Signature]  
CHIEF ENGINEER BUREAU ENGINEER

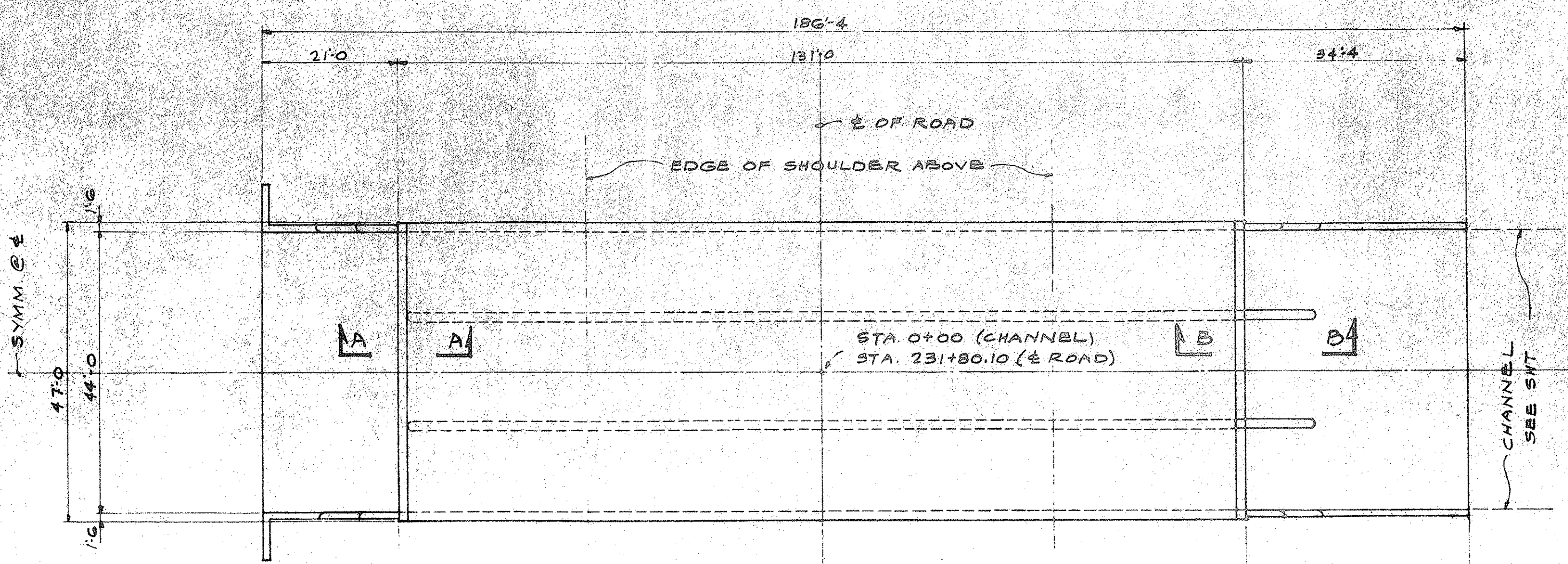
W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY	P. W. BY	S. BY

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

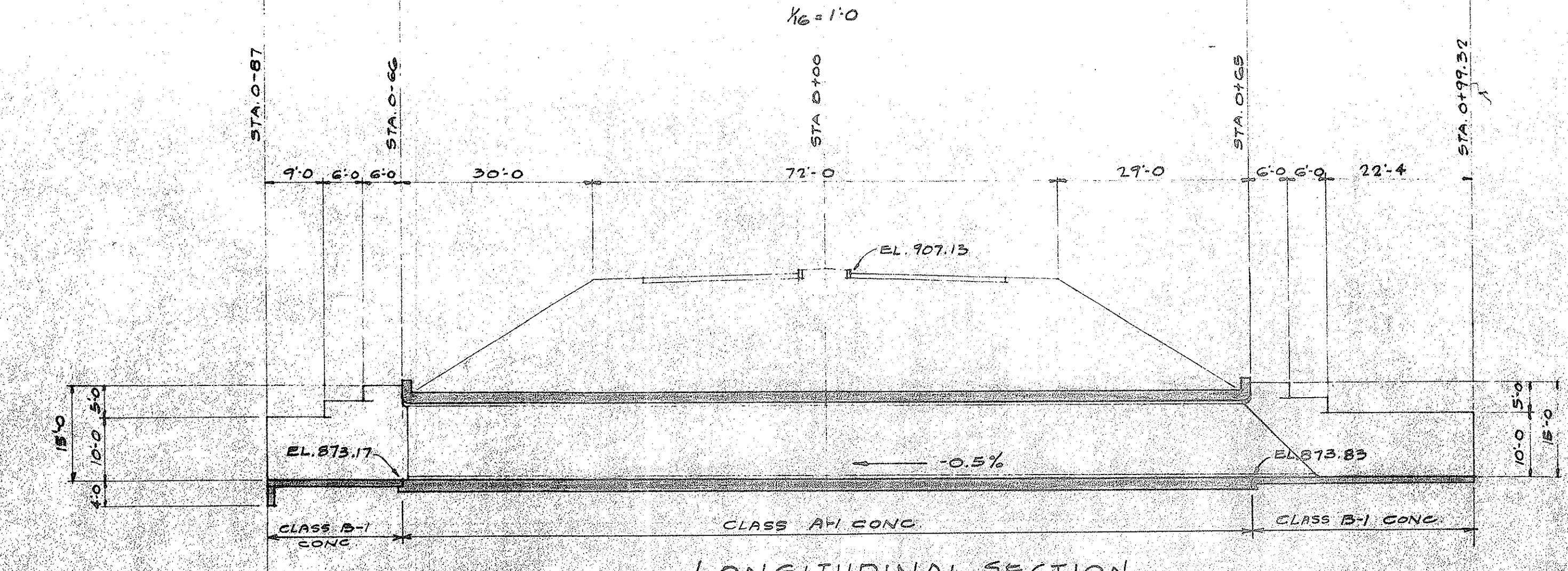
Sheet No. 18 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	1	18

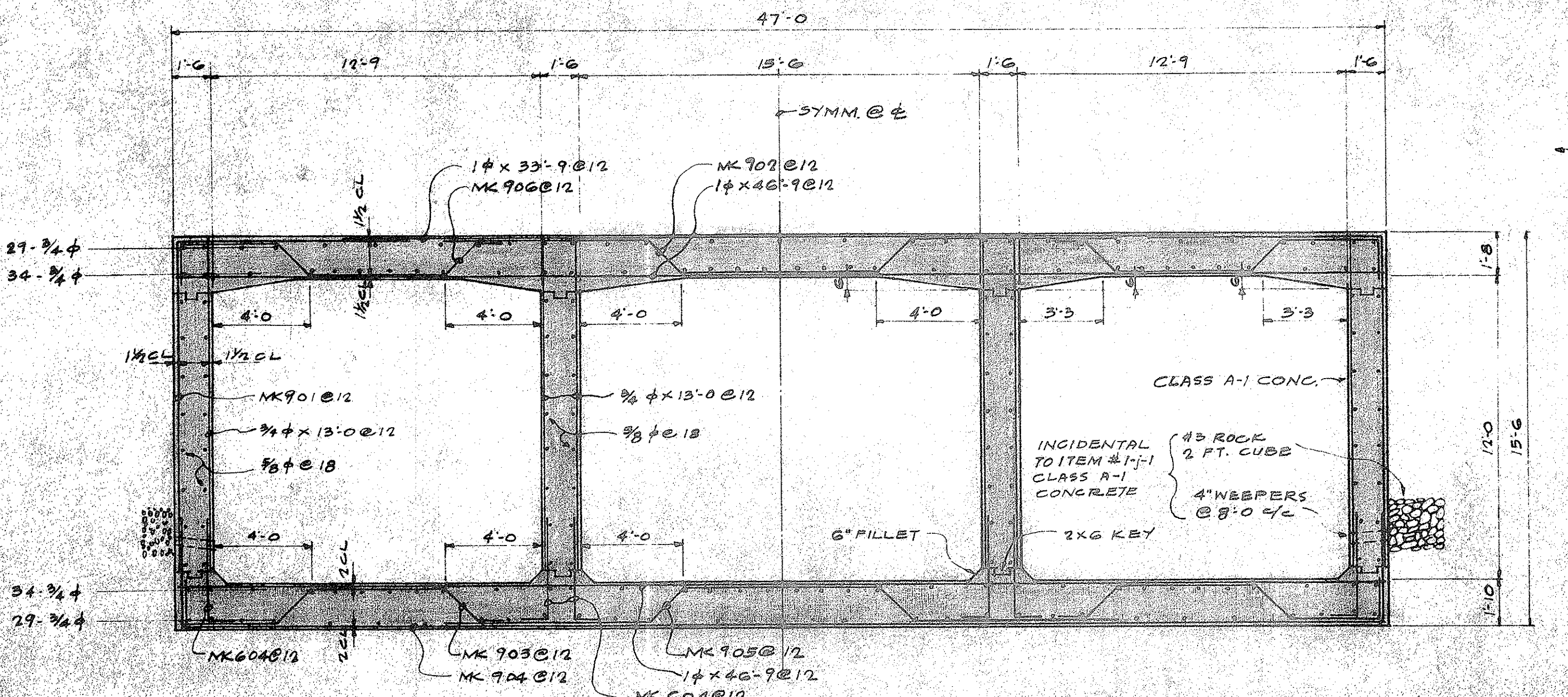




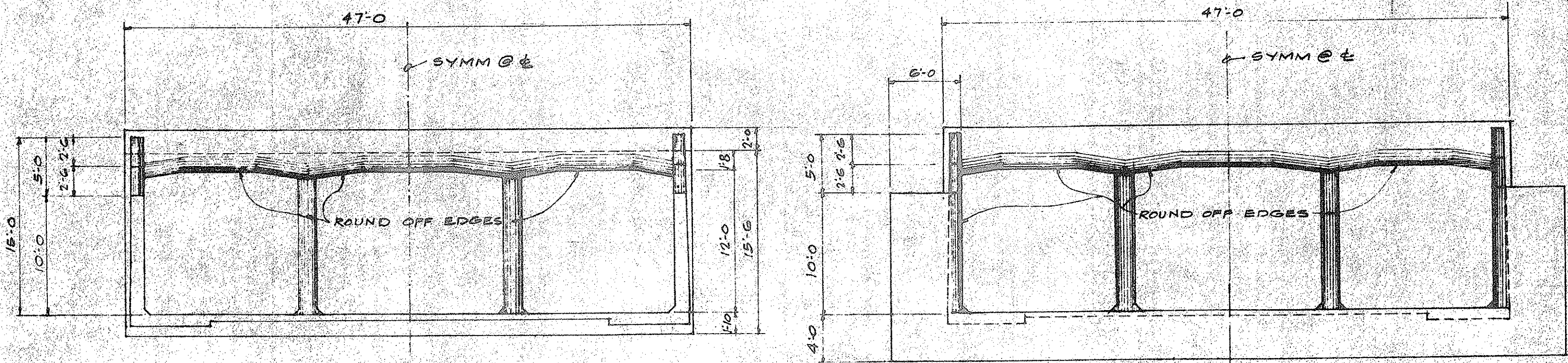
PLAN  
1/16" = 1'-0"



LONGITUDINAL SECTION  
1/16" = 1'-0"

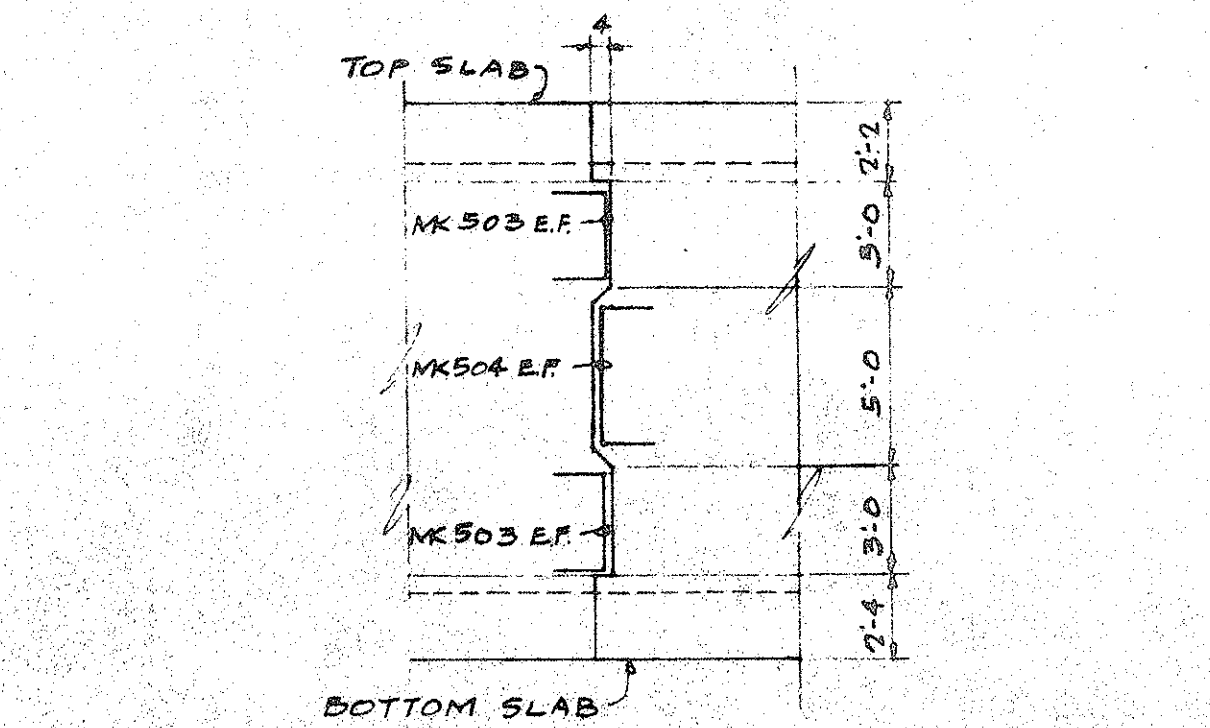


TYPICAL CROSS SECTION  
1/4" = 1'-0"

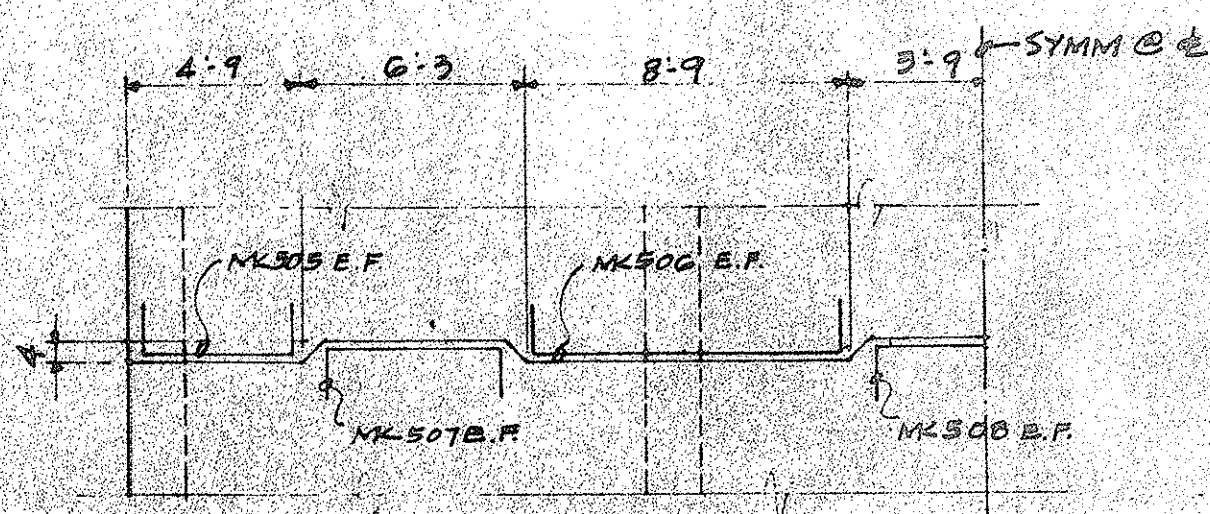


UPSTREAM ELEVATION  
1/8" = 1'-0"

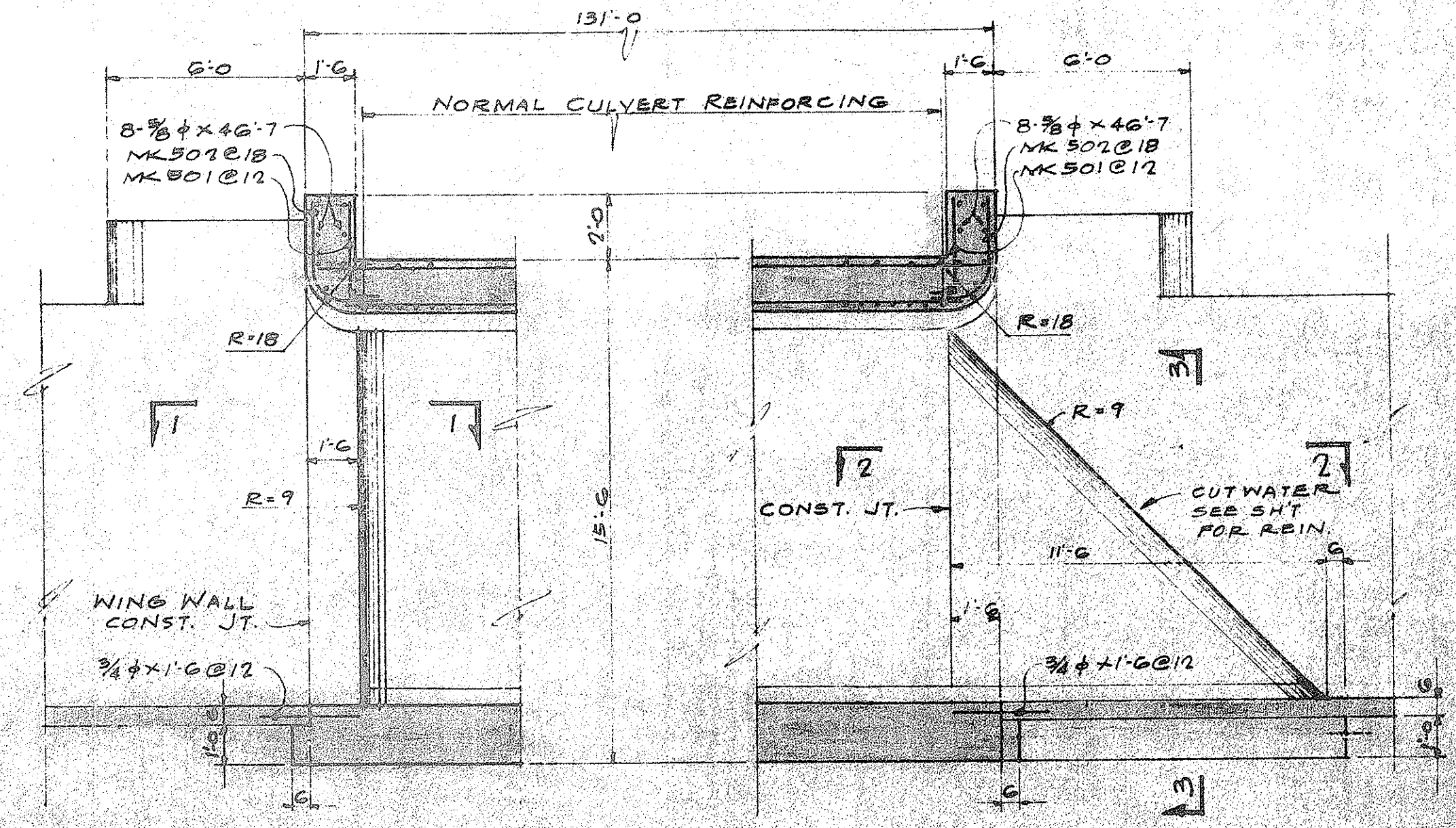
DOWN STREAM ELEVATION  
1/8" = 1'-0"



WALL CONST. JT. DETAIL

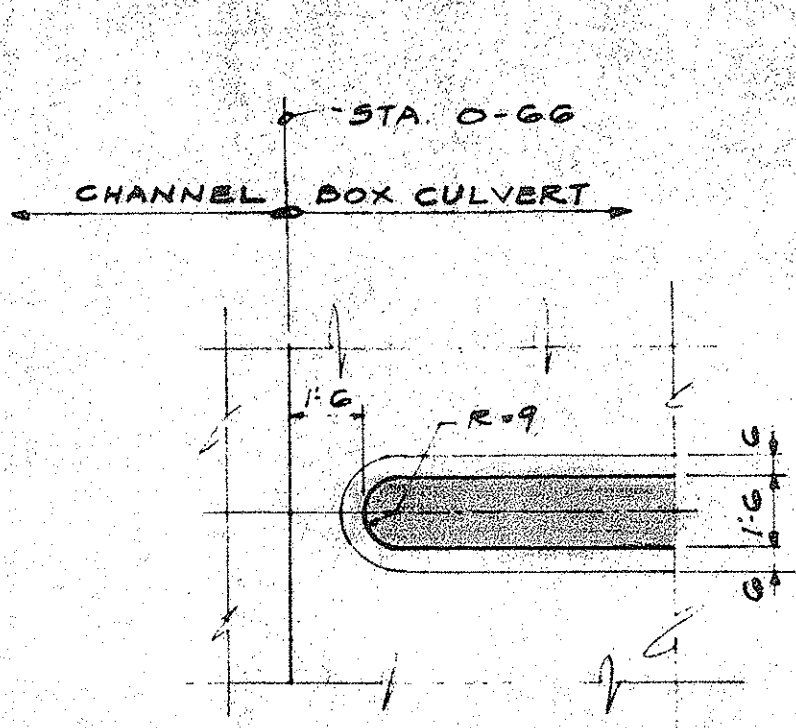


SLAB CONST. JT. DETAIL

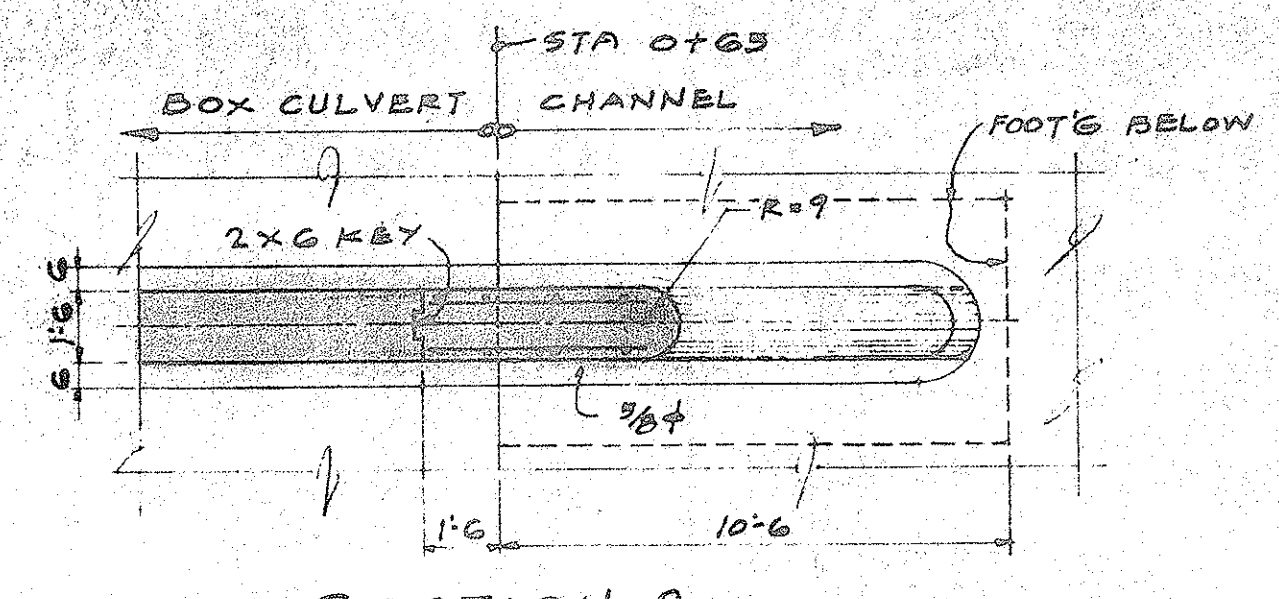


SECTION-A  
1/4" = 1'-0"

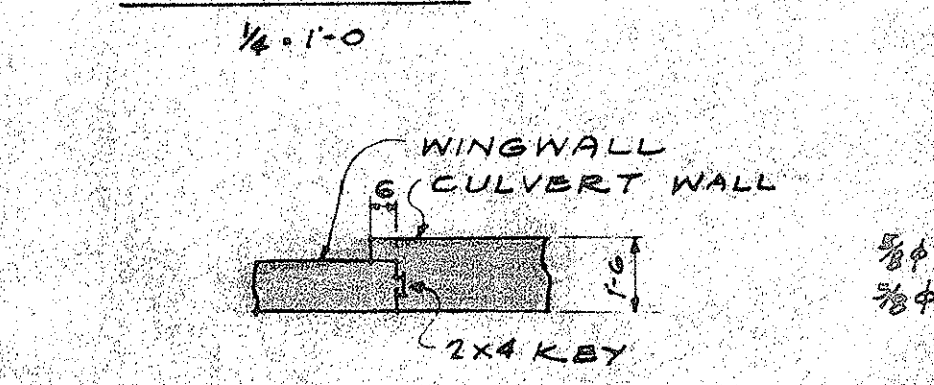
SECTION-B  
1/4" = 1'-0"



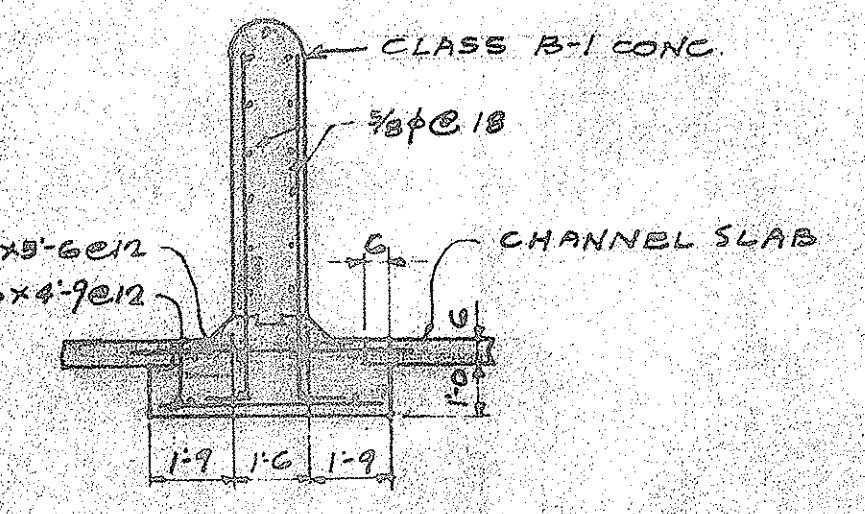
SECTION-1  
1/4" = 1'-0"



SECTION-2  
1/4" = 1'-0"



DETAIL OF WINGWALL AT CULVERT  
1/4" = 1'-0"



SECTION-3  
1/4" = 1'-0"

**STRUCTURAL DESIGN DATA:**  
 WEIGHT OF EARTH 120#/CU. FT.  
 EQUIVALENT FLUID PRESSURE - 30#/FT.  
 LIVE LOAD - NEGLIGIBLE  
 $f_c = 3,000$  PSI @ 28 DAYS  
 $f_s = 1,000$  PSI  
 $v = 90$  PSI  
 $u_L = 180$  PSI  
 $f_t = 20,000$  PSI  
 ALLOWABLE UNIT STRESSES INCREASED 15% (OHIO STATE '51)

**HYDRAULIC DATA**  
 DRAINAGE AREA - 361 ACRES  
 DESIGN DISCHARGE - 4,330 CFS

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

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

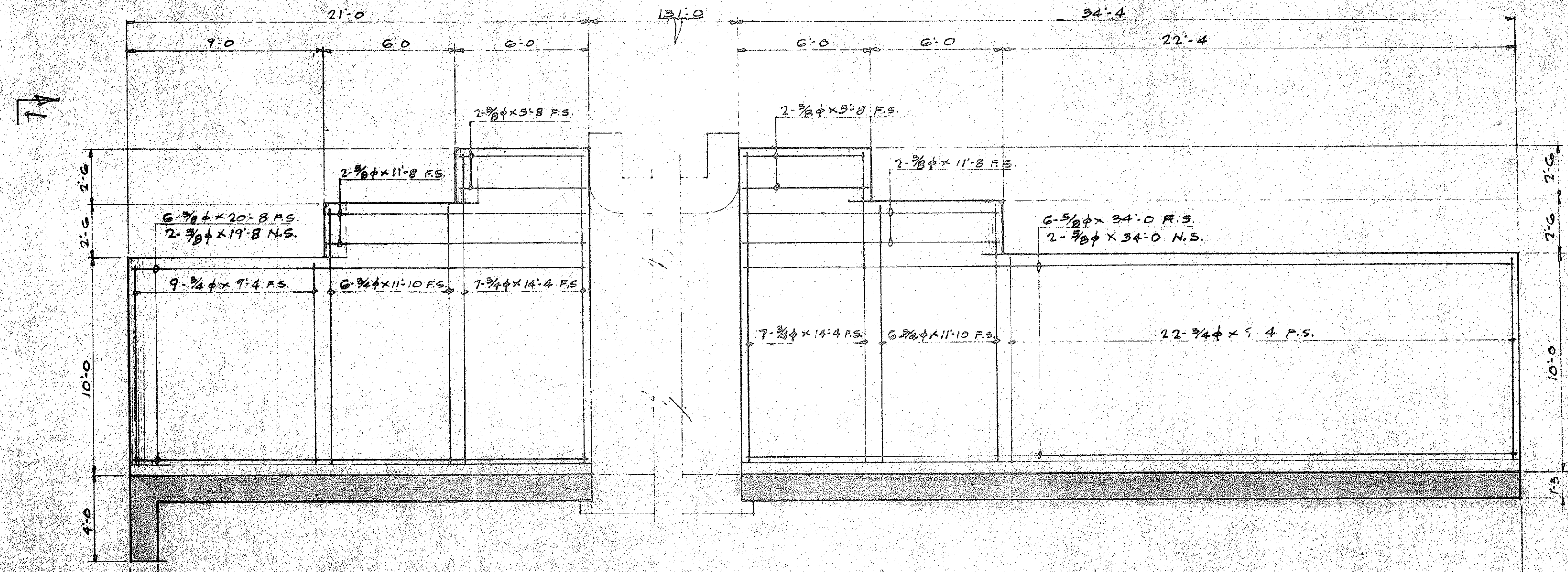
**KALIHI TUNNEL  
 KALIHI APPROACH ROAD  
 3-CELL R.C. BOX CULVERT  
 AT B.L. STA. 231+80.10**

ENGINEER: SOH-W.L. J.R.O. DATE: JULY 15, 1953  
 DRAFTSMAN: J.R.O. CHECKED BY: SOH-W.L. J.R.O.  
 SCALE: AS SHOWN TRACER: J.R.O.  
 APPROVED: *W.L. J.R.O.* APPROVED: *W.L. J.R.O.*  
 CHIEF ENGINEER BUREAU ENGINEER

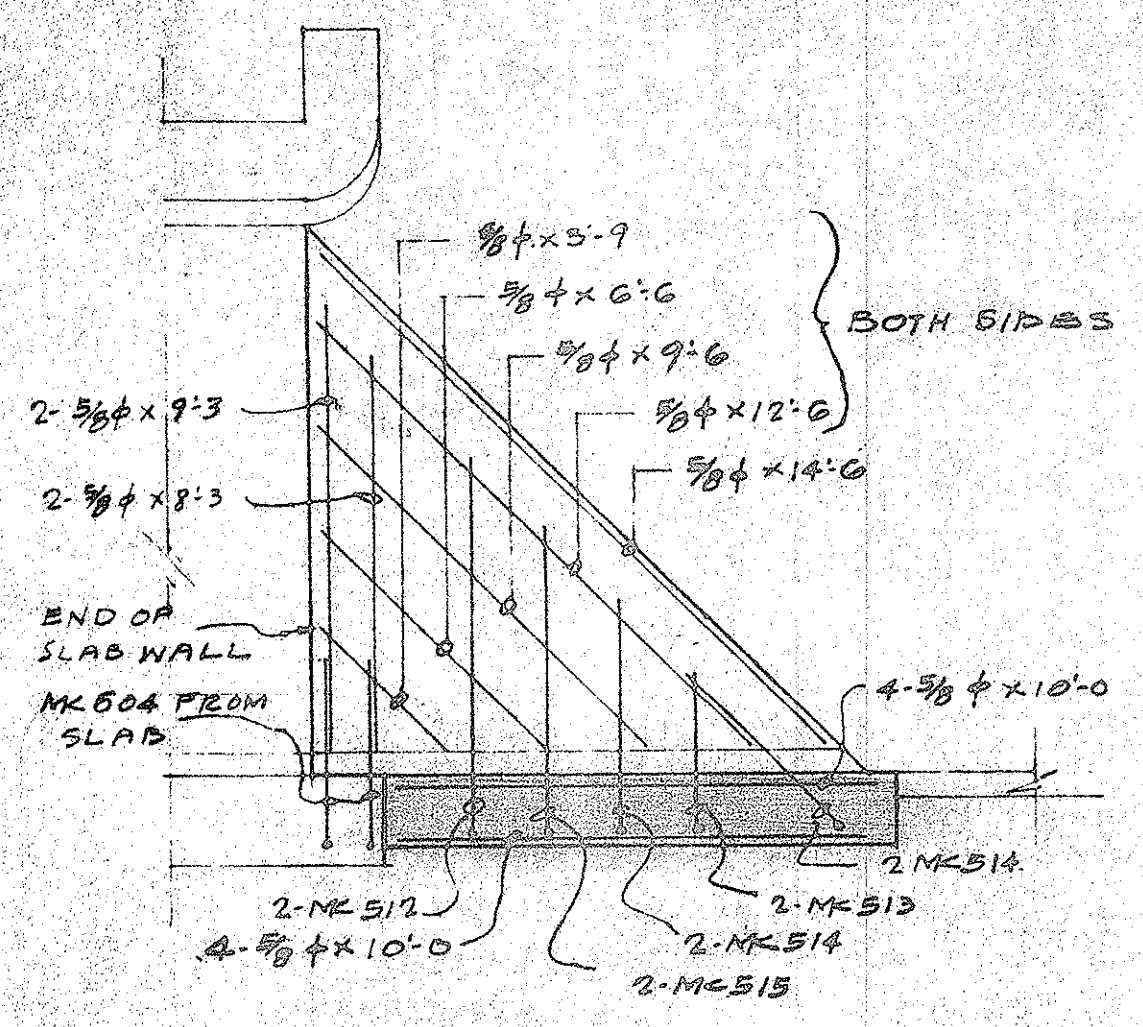
W.S.	PROFILE	C.B.
GR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S. BY

SECTION C JOB NO. 26-53 DWG. R-10

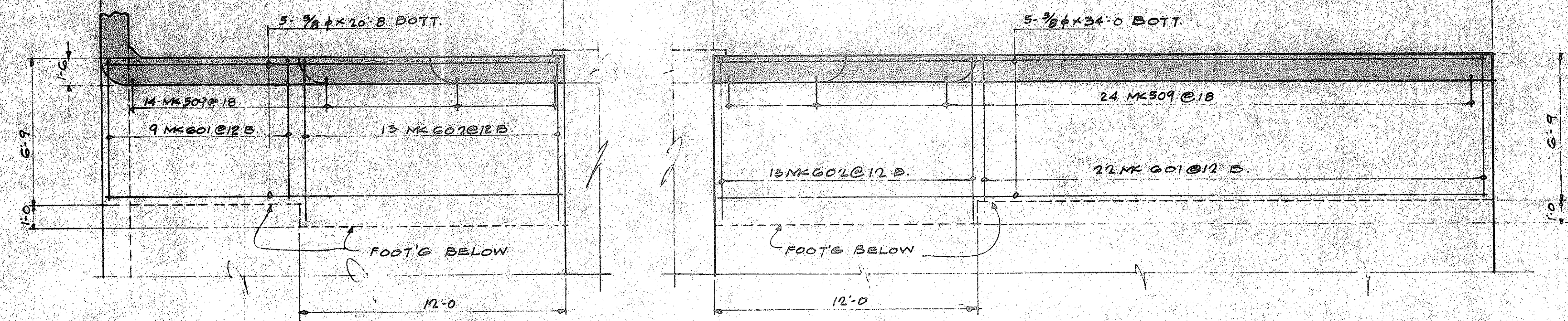




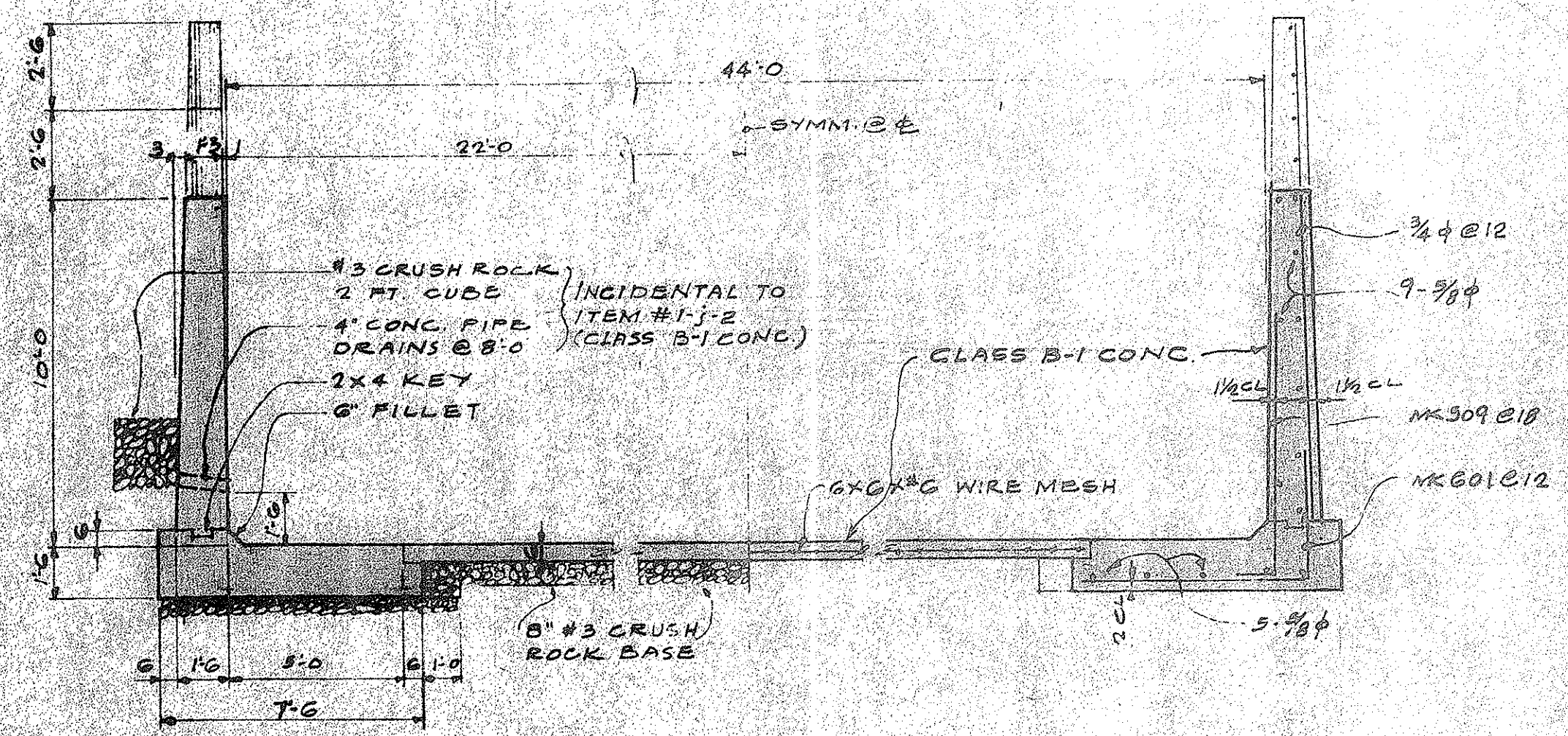
CHANNEL WALL ELEVATION AND REINFORCEMENT



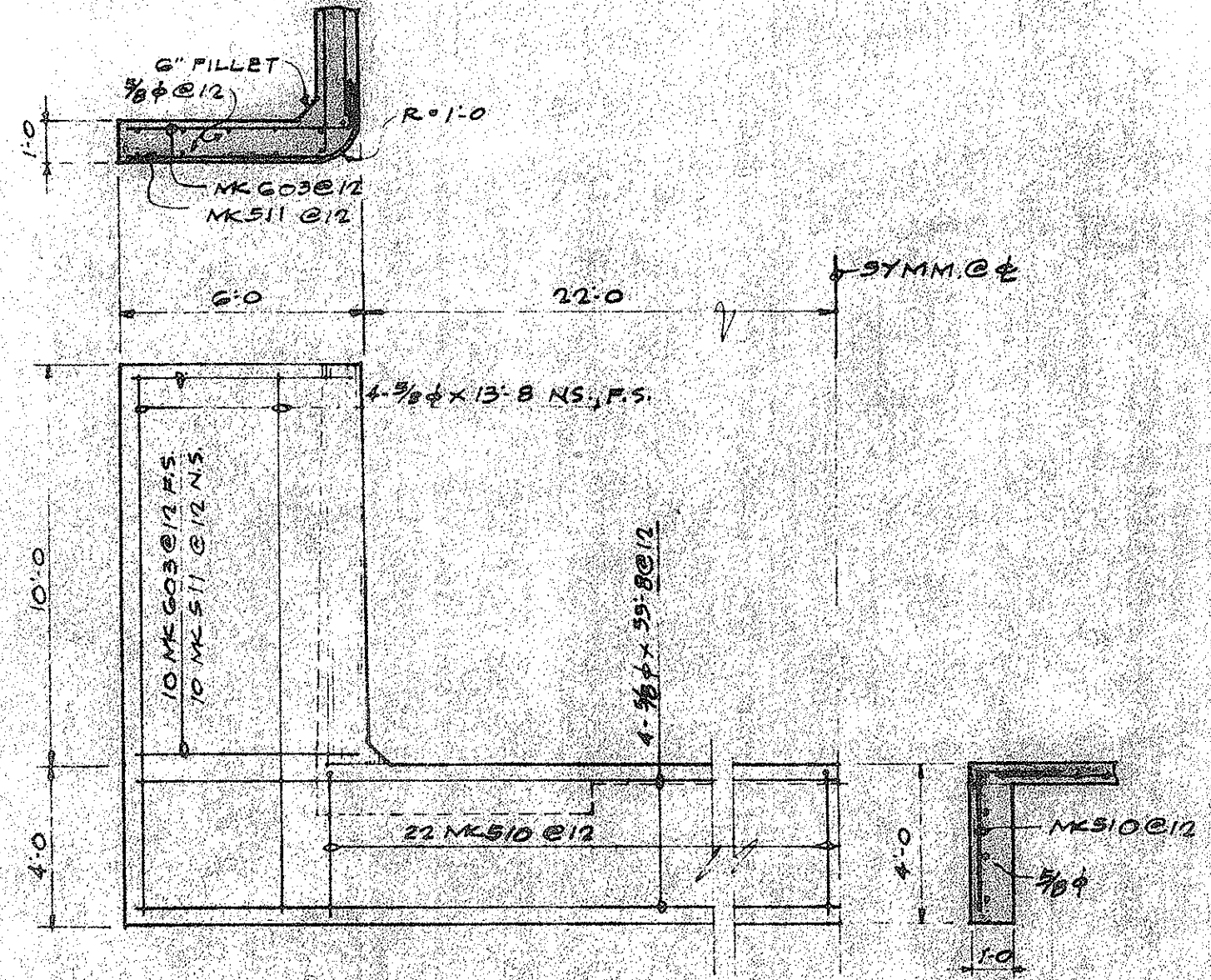
CUTWATER REINFORCING



CHANNEL FOOTING PLAN AND REINFORCEMENT



TYPICAL CHANNEL SECTION



SECTION -1

REINFORCING BAR SCHEDULE									
BENDING DIAGRAM ALL DIMS. OUT TO OUT	MARK	NO.	SIZE	LENGTH	REMARKS	LBS.	C.Y.	STEEL CONC.	
	903	204	1#	14'-0"	BOTTOM SLAB	71576	4206		
	904	132	1#	54'-9"					
	905	132	1#	27'-9"					
	604	792	3/4#	5'-0"					
	63	3/4#	40'-0"	TOP SLAB	3289	54.3			
	63	3/4#	14'-0"						
	901	264	1#						22'-9"
	792	3/4#	13'-0"						
	64	3/4#	40'-0"	TOP SLAB	3289	54.3			
	64	3/4#	11'-0"						
	906	264	1#						14'-4"
	902	132	1#						27'-8"
	63	3/4#	40'-0"	TOP SLAB	3289	54.3			
	63	3/4#	14'-0"						
	301	94	3/4#						4'-4"
	302	60	3/4#						4'-3"
	16	3/4#	46'-7"	BOTT. SLAB	18089	117.1			
	74	3/4#	1'-6"						
	303	16	3/4#						3'-8"
	304	8	3/4#						5'-8"
	305	8	5'-5"	BOTT. SLAB	18089	117.1			
	306	8	9'-3"						
	307	8	6'-11"						
	308	4	3/4#						8'-1"
SUB-TOTAL						18089	117.1		
BOTT. SLAB						31.4	33.5		
FOOTING						31.25	51.1		
CUTWATER						7.21	7.9		
STEM						3301	56.5		
STEM						223	7.8		
FOOTING						539	60		
SUB-TOTAL						8022	148.9		
SUB-TOTAL						18089	117.1		

**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. 1622 Cu. Yds.  
 EXCAVATION FOR STRUCTURE 2,240 Cu. Yds.  
 6X6X42" WIRE MESH REQ'D. 874 Pounds

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

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: JUL 18, 1953  
 DRAFTSMAN: *[Signature]* CHECKED BY: *[Signature]*  
 SCALE: AS SHOWN TRACER: *[Signature]*  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

W.S. PROFILE C.S.  
 CR. SEC. F.B. S.B.  
 W.M. BY F.W. BY S.B.

SECTION G JOB NO. 26-53 DWG. R-11  
 Sheet No. 20 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	1	20



FINAL SURVEY  
 SURVEYED BY  
 DATE  
 TEMPLATE NO.  
 NOTE BOOK NO.  
 AREAS CHECKED

ORIGINAL SURVEY  
 SURVEYED BY  
 DATE  
 TEMPLATE NO.  
 NOTE BOOK NO.  
 AREAS CHECKED

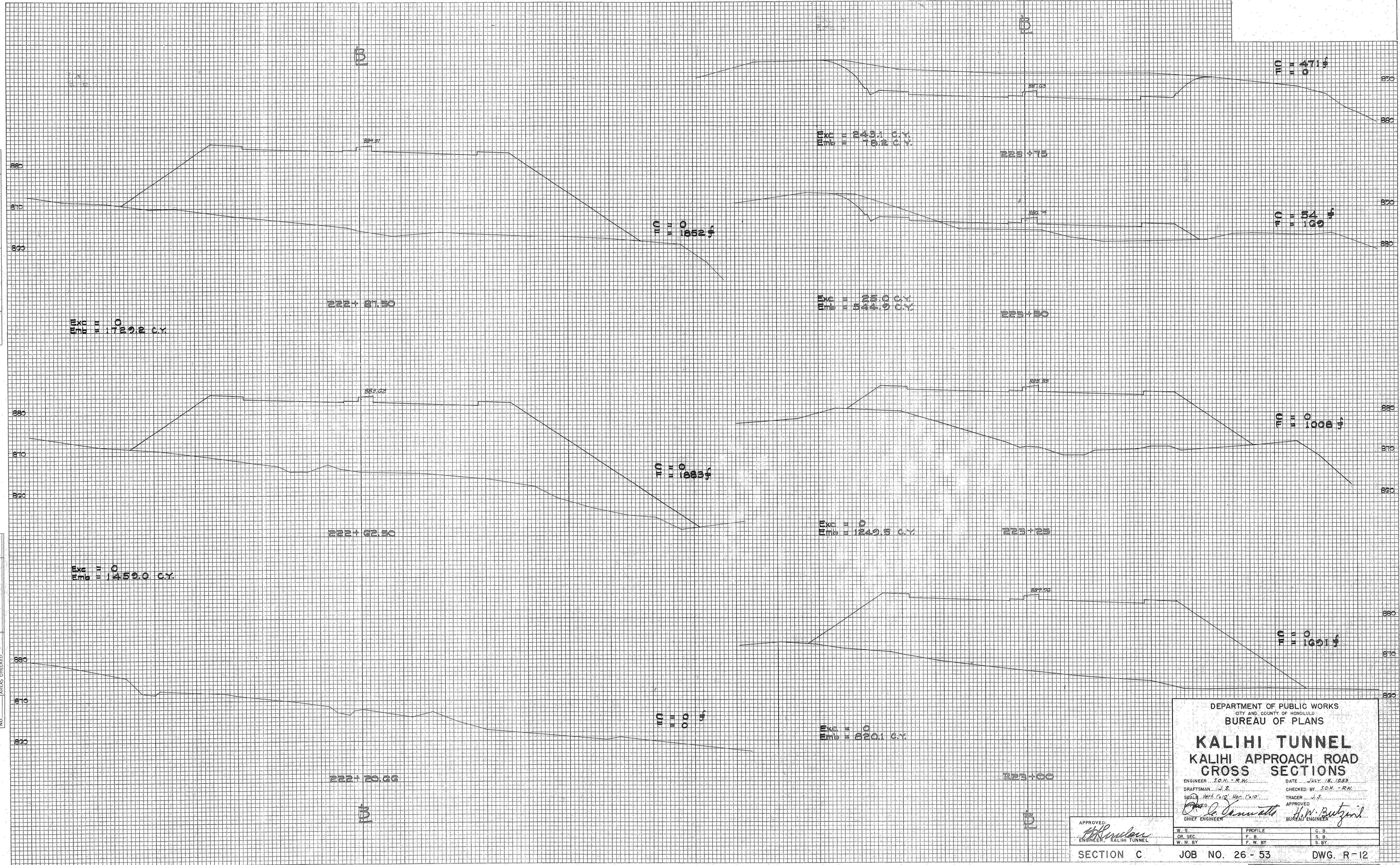


PLATE 3 - CROSS SECTION O. P. R. & R. E. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK

APPROVED  
*[Signature]*  
 ENGINEER, KALIHI TUNNEL

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS  
 ENGINEER S.O.H. - R.K. DATE JULY 15, 1953  
 DRAFTSMAN J.S. CHECKED BY S.O.H. - R.K.  
 SCALE 1/4" = 1'-0" HORIZ. 1/8" = 1'-0" VERT.  
 TRACER J.S.  
 APPROVED  
*[Signature]* H.W. Butzard  
 CHIEF ENGINEER BUREAU ENGINEER

SECTION C JOB NO. 26 - 53 DWG. R-12

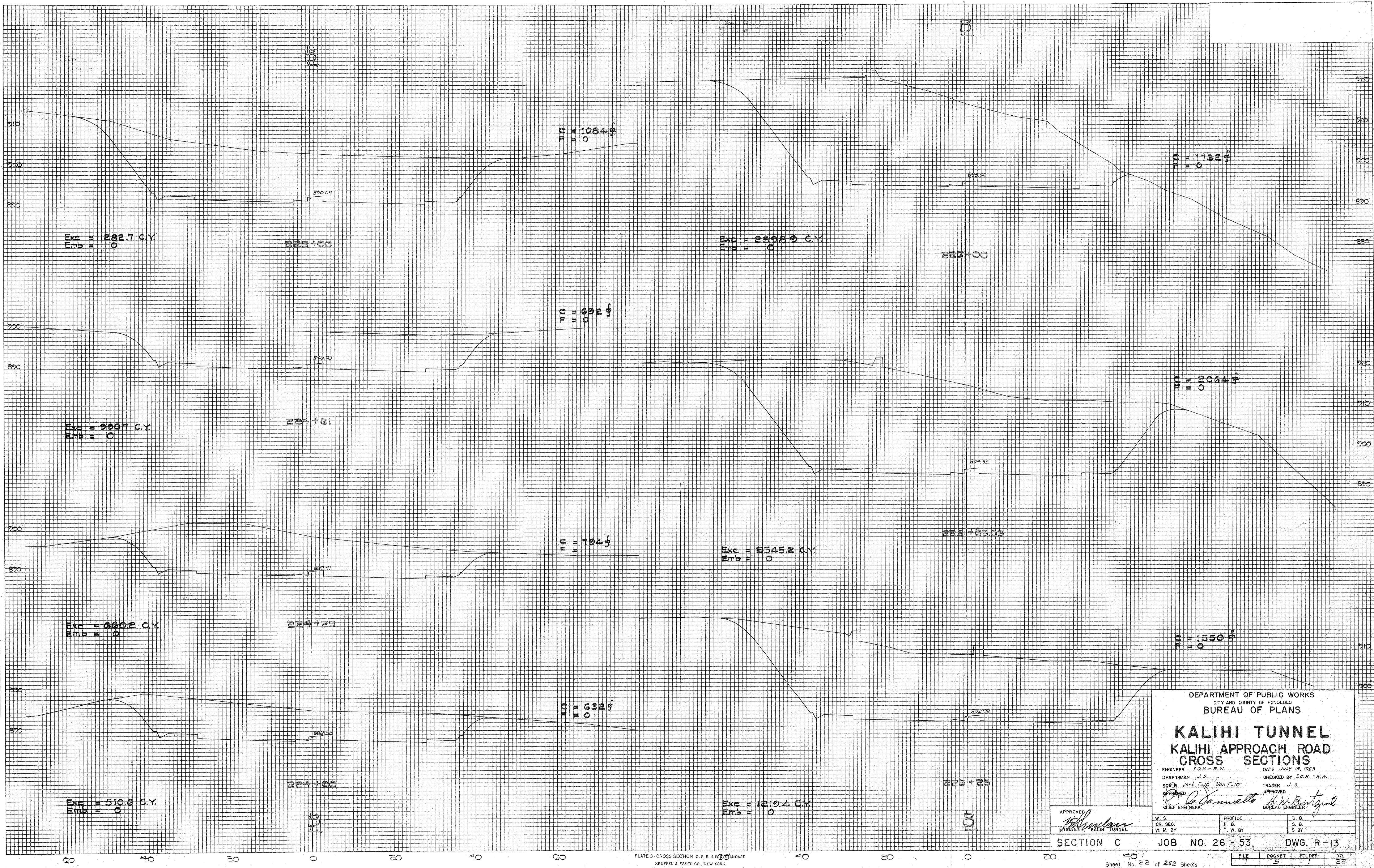
Sheet No. 21 of 252 Sheets

FILE	POCKET	FOLDER	NO.
			21



FINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK, TEMPLATE, AREAS CHECKED.

ORIGINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK, TEMPLATE, AREAS CHECKED.



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

### KALIHI TUNNEL

#### KALIHI APPROACH ROAD

#### CROSS SECTIONS

ENGINEER: S.C.H. - R.W. DATE: JULY 15, 1953  
 DRAFTSMAN: J.S. CHECKED BY: S.C.H. - R.W.  
 SCALE: Vert. 1"=10', Hor. 1"=10' TRACER: J.S.  
 APPROVED: *[Signature]* CHIEF ENGINEER  
 APPROVED: *[Signature]* BUREAU ENGINEER

APPROVED: *[Signature]* ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	G. B.
CH. SEG.	F. B.	S. B.
W. H. BY	F. W. BY	S. BY

SECTION C JOB NO. 26-53 DWG. R-13



FINAL SURVEY BY DATE  
 SURVEYED BY DATE  
 PLOTTED BY DATE  
 NOTE BOOK NO.  
 AREAS CHECKED

ORIGINAL SURVEY BY DATE  
 SURVEYED BY DATE  
 PLOTTED BY DATE  
 NOTE BOOK NO.  
 AREAS CHECKED

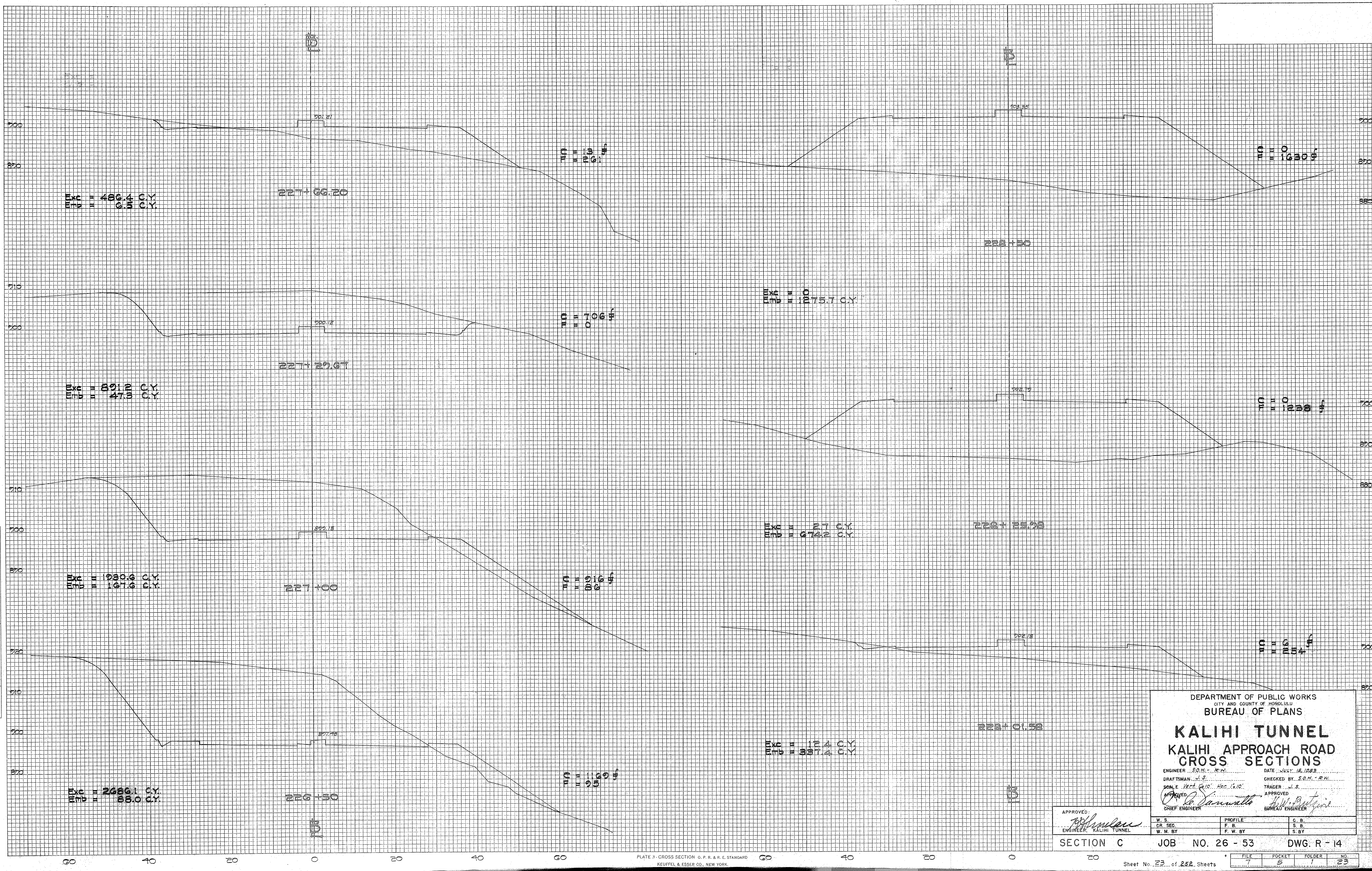


PLATE 3 - CROSS SECTION O. P. R. & R. E. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS

ENGINEER: S.C.H. R.K. DATE: JULY 16, 1953  
 DRAFTSMAN: J.S. CHECKED BY: S.C.H. R.K.  
 SCALE: Vert. 1" = 10'. Hor. 1" = 40'. TRACER: J.S.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED: *[Signature]*  
 ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	G. B.
CR. SEC.	F. E.	S. B.
W. M. BY	F. W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. R - 14

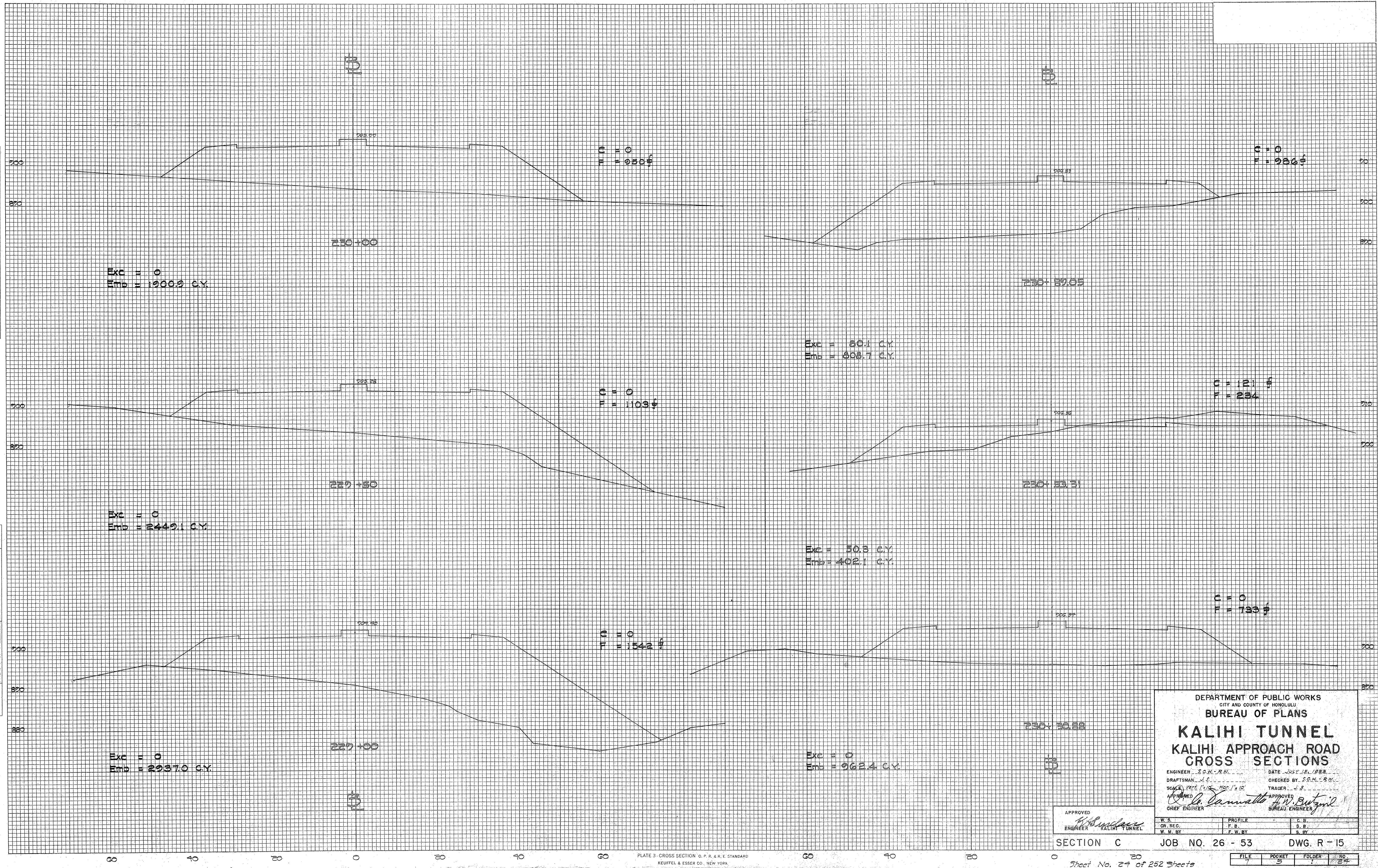
Sheet No. 23 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	6	1	23



FINAL SURVEY  
 SURVEYED  
 PLOTTED  
 TEMPLATE  
 NOTE BOOK  
 AREAS CHECKED  
 NO.

ORIGINAL SURVEY  
 SURVEYED  
 PLOTTED  
 TEMPLATE  
 NOTE BOOK  
 AREAS CHECKED  
 NO.



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS  
 ENGINEER S.C.H.-R.W. DATE JULY 15, 1952  
 DRAFTSMAN J.S. CHECKED BY S.C.H.-R.W.  
 S.C.H. Vert. Eng. - Nov. 12, 52 TRACER J.S.  
 APPROVED *W. Dammit* APPROVED *W. Butz*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*W. Dammit*  
 ENGINEER KALIHI TUNNEL

W. S.	PROFILE	C. B.
CH. SEC.	F. B.	S. B.
W. W. BY	F. W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. R - 15

Sheet No. 27 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	1	27

PLATE 3 - CROSS SECTION O. P. R. & R. E. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK



FINAL SURVEYED BY DATE  
 SURVEY PLOTTED  
 NOTE BOOK TEMPLATE  
 NO. AREAS CHECKED

ORIGINAL SURVEYED BY DATE  
 SURVEY PLOTTED  
 NOTE BOOK TEMPLATE  
 NO. AREAS CHECKED

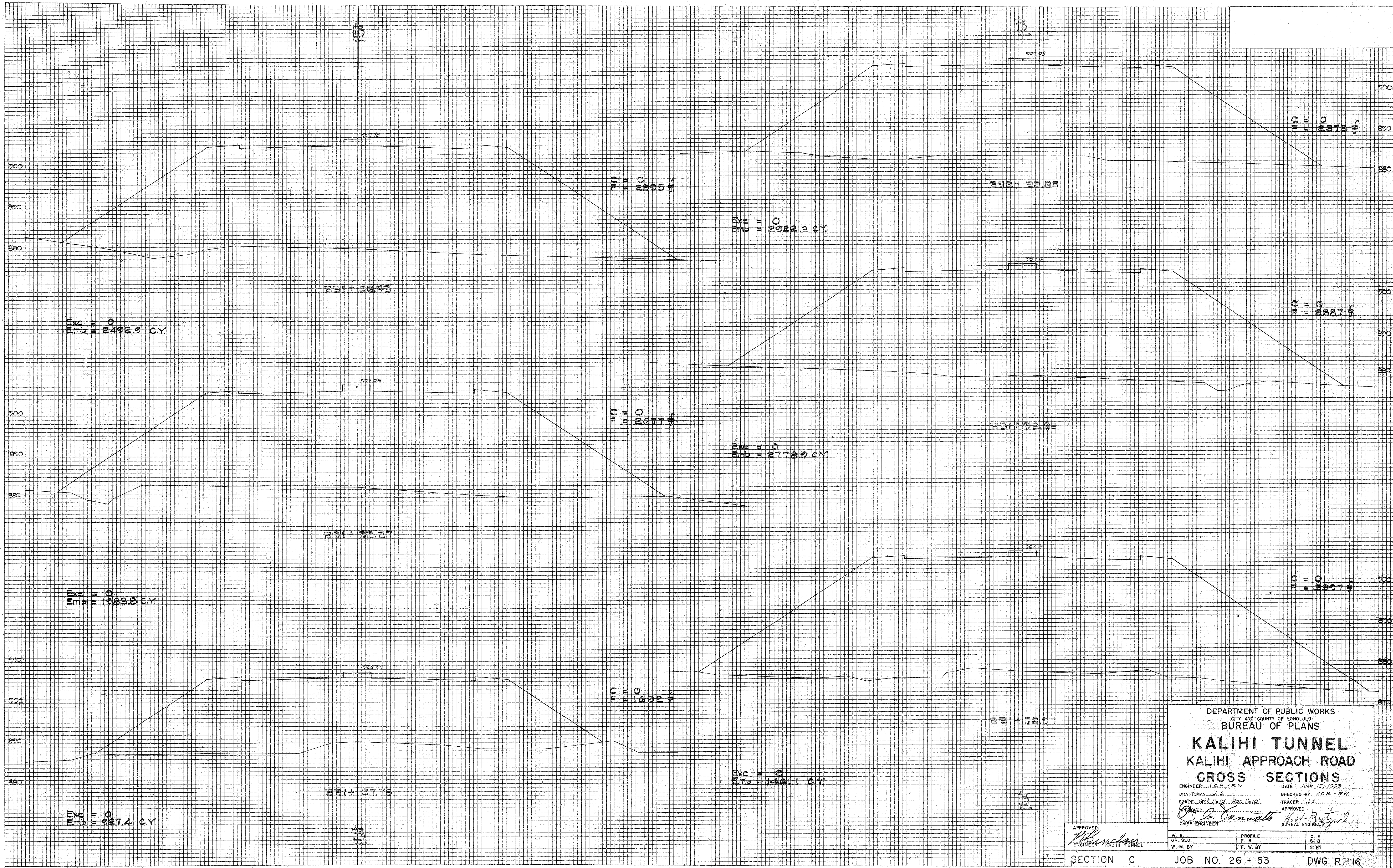


PLATE 3 - CROSS SECTION O. P. R. & R. E. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK

APPROVED  
 W. S. OR. SEC. ENGINEER, KALIHI TUNNEL  
 F. B. C. W. BY  
 G. B. S. B. S. BY

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS  
 ENGINEER S.G.H.-R.M. DATE JULY 15, 1953  
 DRAFTSMAN J.S. CHECKED BY S.G.H.-R.M.  
 STATE VECT. CO. INC. HON. H.I. TRACER J.S.  
 APPROVED  
 CHIEF ENGINEER BUREAU ENGINEER

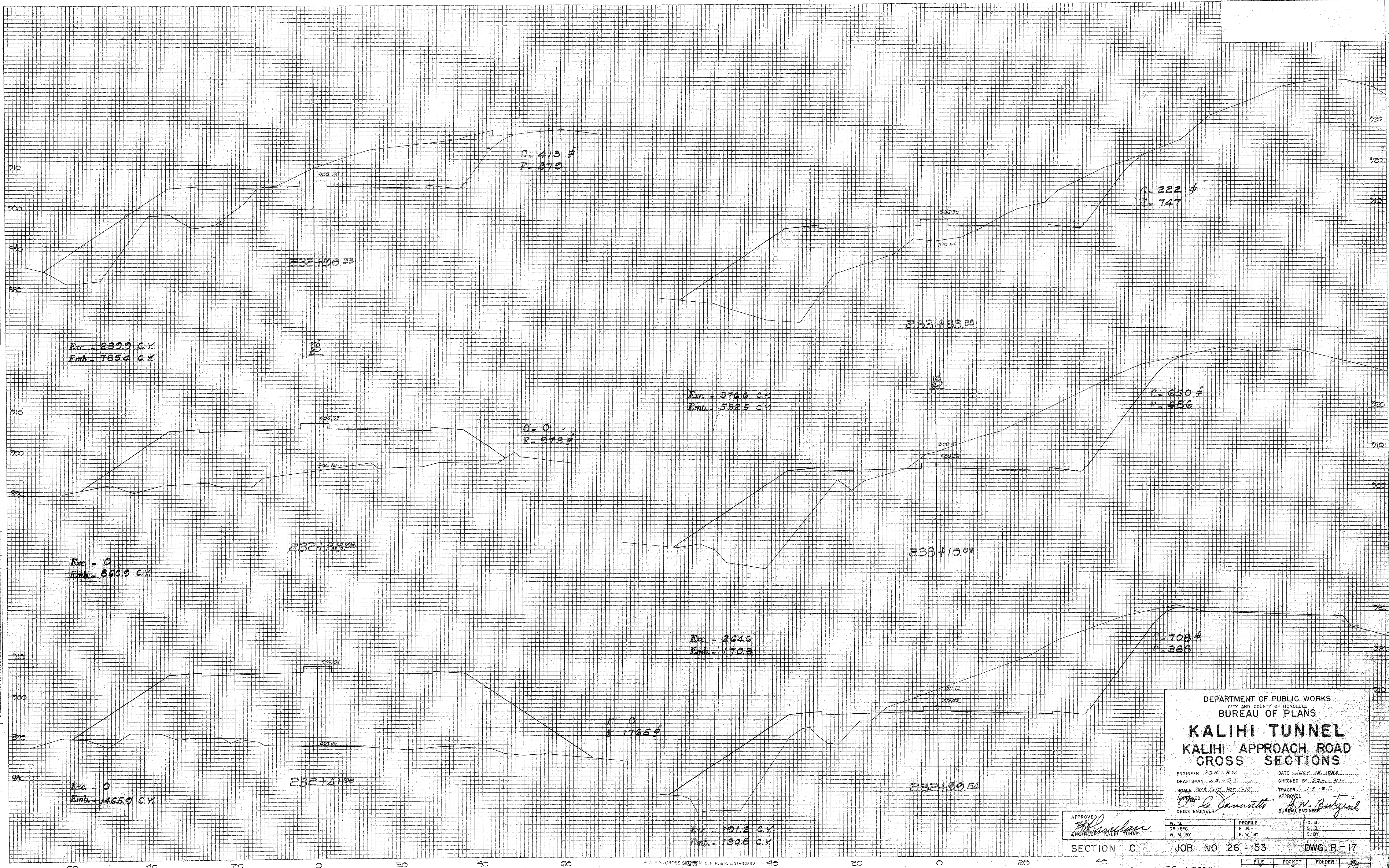
SECTION C JOB NO. 26 - 53 DWG. R - 16

FILE	POCKET	FOLDER	NO.
7	5	1	25



FINAL SURVEY SURVEYED, PLOTTED, AND CHECKED. NO. BY DATE

ORIGINAL SURVEY SURVEYED, PLOTTED, AND CHECKED. NO. BY DATE



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS

ENGINEER S.M.H.-R.M. DATE JULY 15, 1953  
 DRAFTSMAN J.S.-S.T. CHECKED BY S.M.H.-R.M.  
 SCALE Vert. 1" = 10' Hor. 1" = 10' TRACER J.S.-S.T.  
 APPROVED  
 CHIEF ENGINEER H.W. Butzger BUREAU ENGINEER

APPROVED  
 W.S. PROFILE G.B.  
 GR. SEC. F.B. S.B.  
 W.M. BY F.W. BY S. BY

SECTION C JOB NO. 26 - 53 DWG. R-17



FINAL SURVEY PLOTTED  
 SURVEYED PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_

ORIGINAL SURVEY PLOTTED  
 SURVEYED PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_

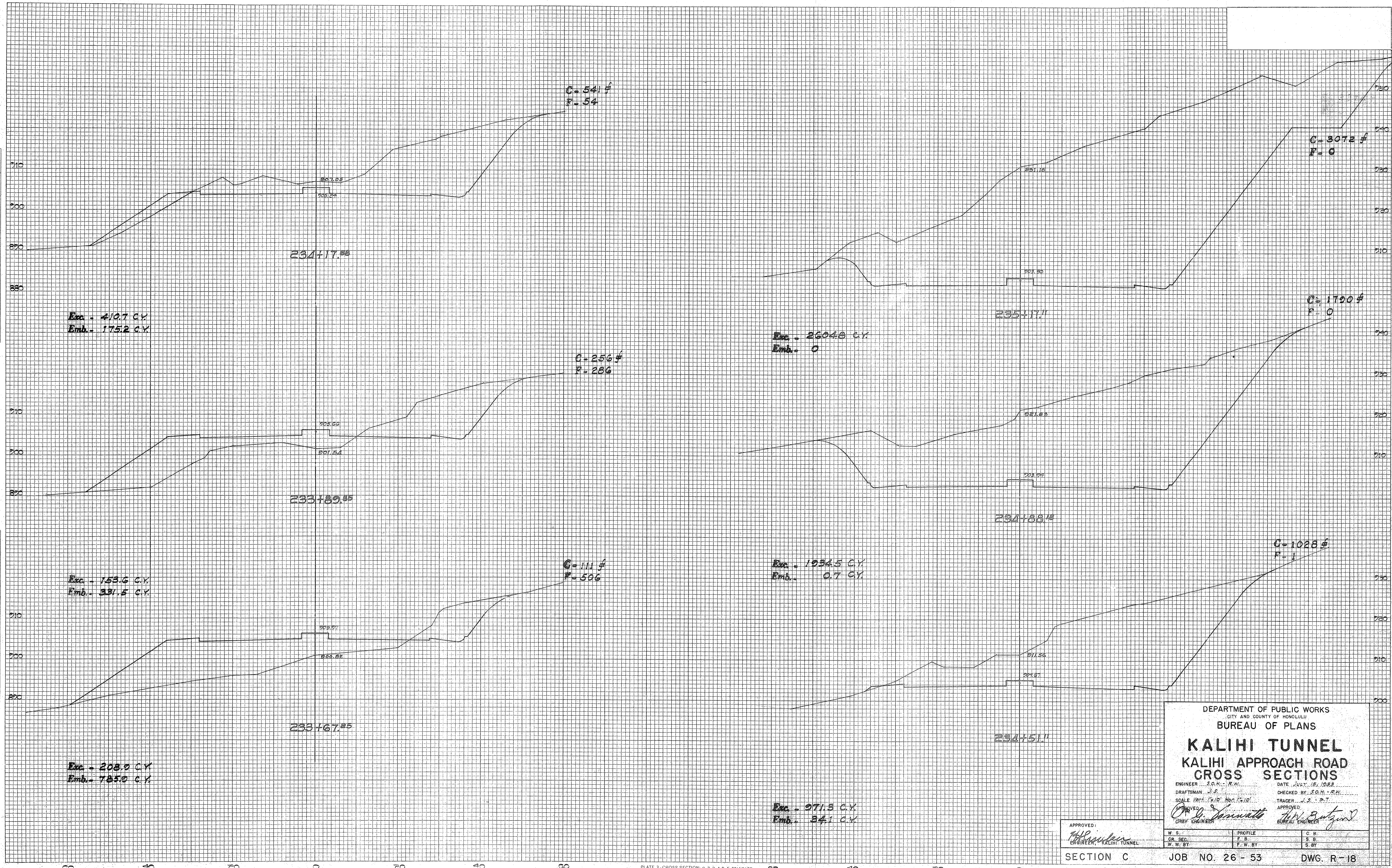


PLATE 3 - CROSS SECTION O. P. R. & E. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK.

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

### KALIHI TUNNEL KALIHI APPROACH ROAD CROSS SECTIONS

ENGINEER S.O.M. - R.M. DATE JULY 15, 1952  
 DRAFTSMAN J.S. CHECKED BY S.O.M. - R.M.  
 SCALE Vert. 1"=10' Hor. 1"=10' TRACER J.S. - S.T.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
OR. SEC.	F. S.	S. B.
W. W. BY	F. W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. R-18

FILE	POCKET	FOLDER	NO.
7	5	1	27



FINAL SURVEY  
 SURVEYED BY  
 DATE  
 TEMPLATE NO.  
 NOTE BOOK NO.  
 AREAS CHECKED

ORIGINAL SURVEY  
 SURVEYED BY  
 DATE  
 TEMPLATE NO.  
 NOTE BOOK NO.  
 AREAS CHECKED

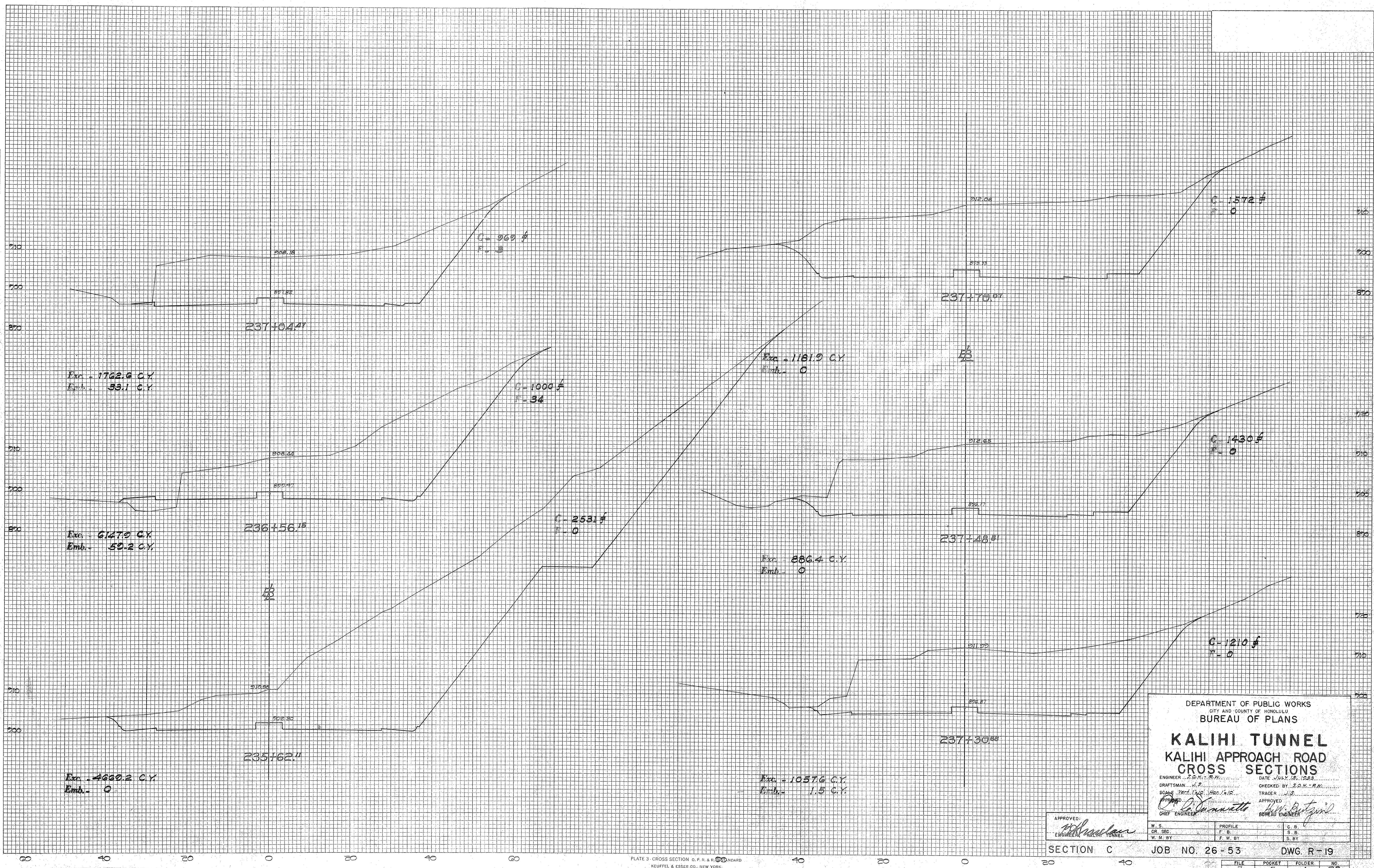


PLATE 3 - CROSS SECTION O.P.R. & R.O. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK

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

### KALIHI TUNNEL KALIHI APPROACH ROAD CROSS SECTIONS

ENGINEER - S.O.M. - R.W. DATE - JULY 15, 1953  
 DRAFTSMAN - J.S. CHECKED BY - S.O.M. - R.W.  
 SCALE - Vert. 1" = 100' Hor. 1" = 10'  
 TRACER - J.S.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER ASSISTANT ENGINEER

W.S.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S. BY

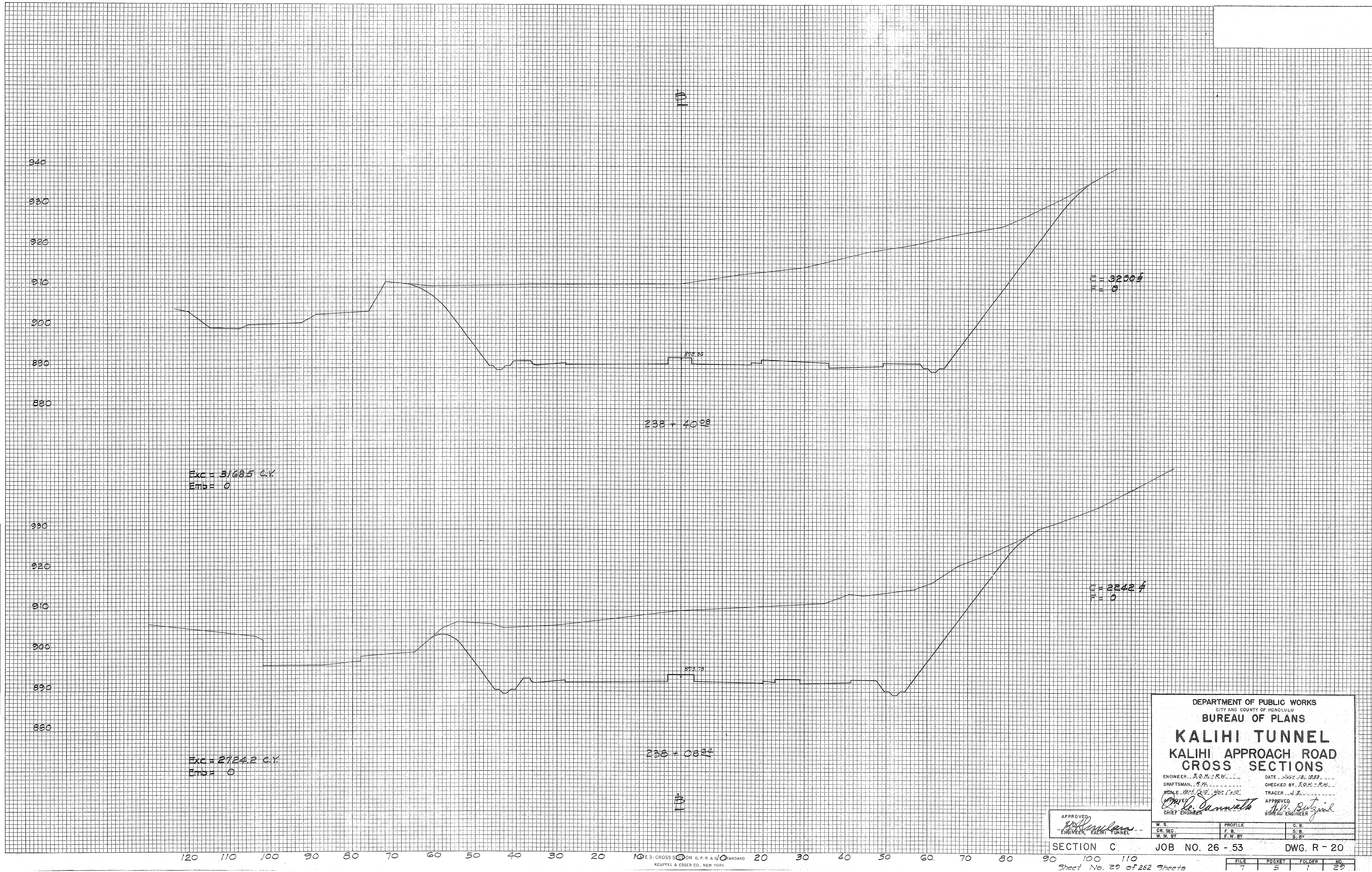
SECTION C JOB NO. 26-53 DWG. R-19

FILE	POCKET	FOLDER	NO.
			26



FINAL SURVEY  
 SURVEYED, PLOTTED, CHECKED, DATE  
 NO. AREAS CHECKED

ORIGINAL SURVEY  
 SURVEYED, PLOTTED, CHECKED, DATE  
 NO. AREAS CHECKED



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS

ENGINEER S.O.H. - R.W. DATE JULY 18, 1933  
 DRAFTSMAN R.M. CHECKED BY S.O.H. - R.W.  
 SCALE 1/8" = 1' HORIZ. 1/4" = 10' VERT.  
 TRACER J.S.  
 APPROVED *[Signature]* APPROVED *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*[Signature]*  
 ENGINEER, KALIHI TUNNEL

W.S. C.R. SEC. W.M. BY	PROFILE F.B. F.W. BY	C.B. S.B. S. BY
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SECTION C JOB NO. 26 - 53 DWG. R - 20

Sheet No. 29 of 252 Sheets

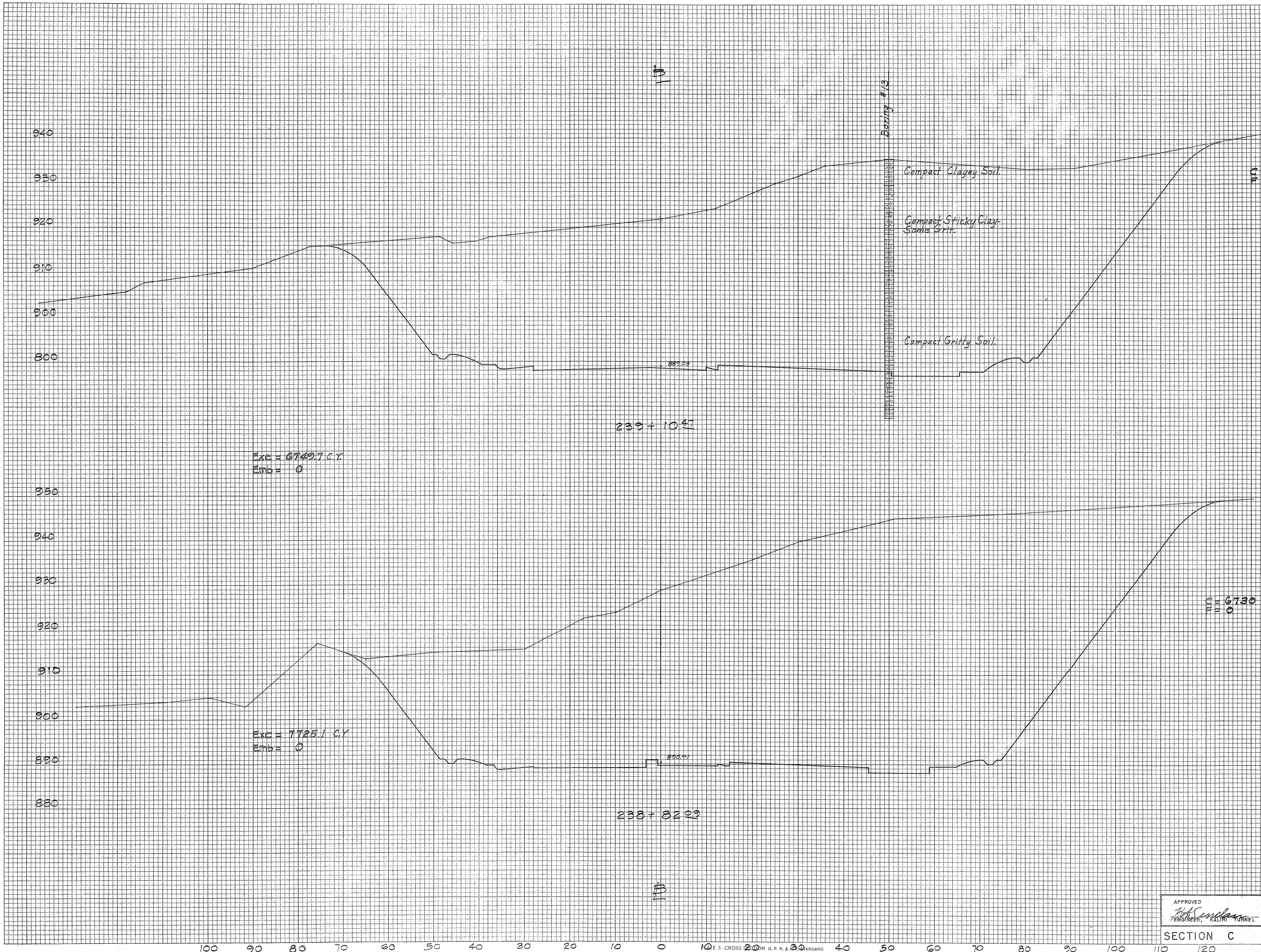
FILE	POCKET	FOLDER	NO.
7	5	1	29

NOTE: CROSS SECTION ON O.P.R. & N.O. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK.



FINAL SURVEY  
 SURVEYED, PLOTTED, NOTE BOOK AREAS CHECKED.  
 BY: \_\_\_\_\_ DATE: \_\_\_\_\_

ORIGINAL SURVEY  
 SURVEYED, PLOTTED, NOTE BOOK AREAS CHECKED.  
 BY: \_\_\_\_\_ DATE: \_\_\_\_\_



Exc = 6742.7 C.Y.  
 Emb = 0

Exc = 7725.1 C.Y.  
 Emb = 0

111 0 6713 #

111 0 6730 #

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS

ENGINEER: S.M.-B.M. DATE: JULY 15, 1952  
 DRAFTSMAN: R.M. CHECKED BY: S.M.-B.M.  
 SCALE: Vert. 1"=10' Hor. 1"=10' TRACER: H.S.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED	PROFILE	C.B.
<i>[Signature]</i>	F.B.	S.B.
ENGINEER, KALIHI TUNNEL	F.W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. R - 21

FILE	POCKET	FOLDER	NO.
7	5	1	30

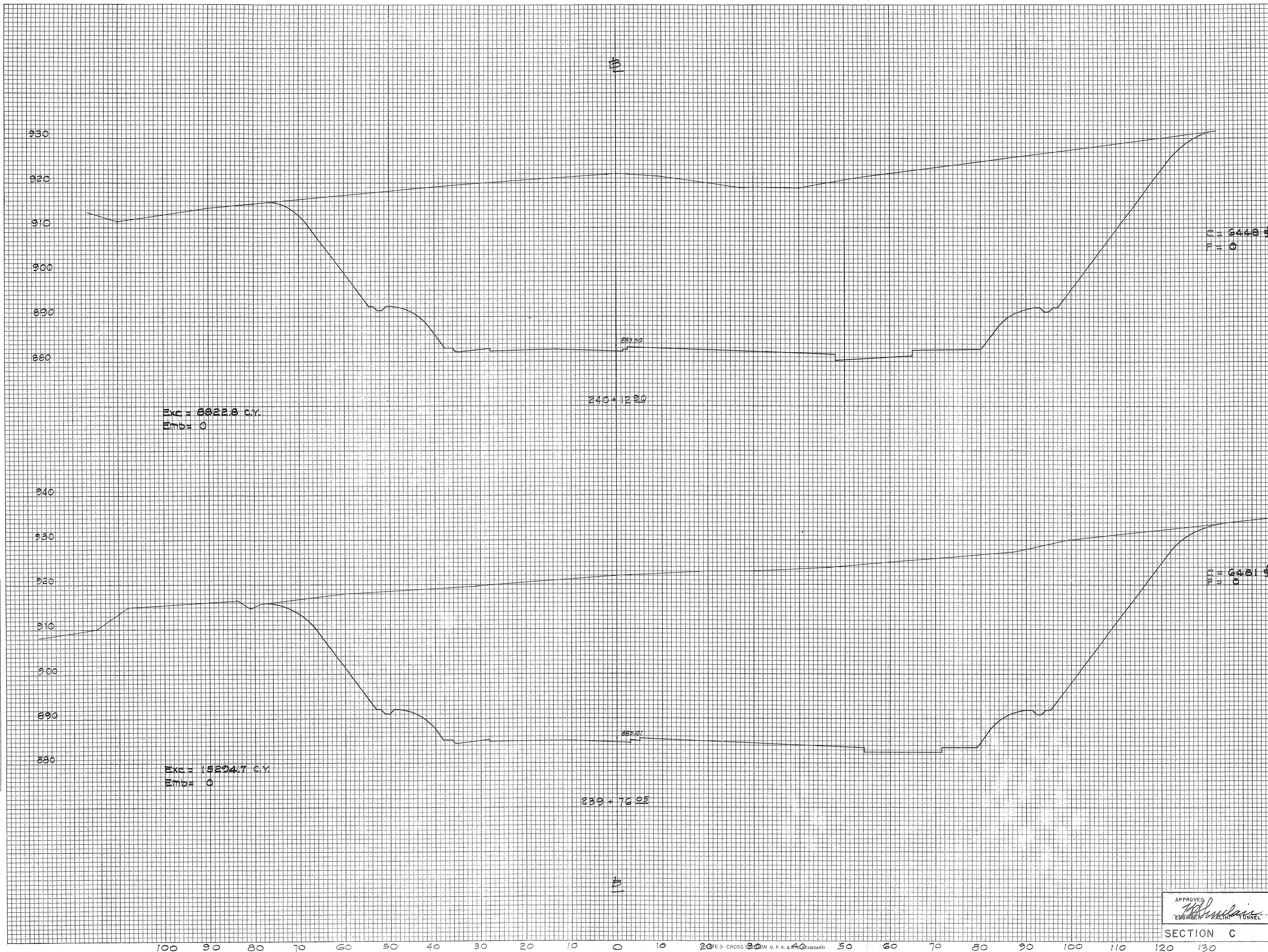
Sheet No. 30 of 252 Sheets

SCALE - CROSS SECTION O.P.R. & STANDARD  
 KEUFFEL & ESSER CO., NEW YORK.



FINAL SURVEY  
 SURVEYED BY  
 PLOTTED BY  
 NOTE BOOK NO.  
 DATE  
 TEMPLATE AREAS CHECKED

ORIGINAL SURVEY  
 SURVEYED BY  
 PLOTTED BY  
 NOTE BOOK NO.  
 DATE  
 TEMPLATE AREAS CHECKED



Exc = 8822.8 C.Y.  
 Emb = 0

Exc = 15294.7 C.Y.  
 Emb = 0

C-6448 #  
 F=0

C-6481 #  
 F=0

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KALIHI APPROACH ROAD  
 CROSS SECTIONS

ENGINEER - S.O.H.-R.K. DATE - JULY 18, 1932  
 DRAFTSMAN - R.M. CHECKED BY - S.O.H.-R.K.  
 SCALE Vert. 1"=10' Hor. 1"=10' TRACER - H.S.  
 APPROVED: *W. J. Vanvleet* CHIEF ENGINEER  
 APPROVED: *H. S. Dutzig* BUREAU ENGINEER

APPROVED  
*W. J. Vanvleet*  
 ENGINEER KALIHI TUNNEL

W.S.	PROFILE	G.B.
OR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S. BY

SECTION C JOB NO. 26-53 DWG. R-22

NOTE 3 - CROSS SECTION ON O.P.R. & A.O. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK

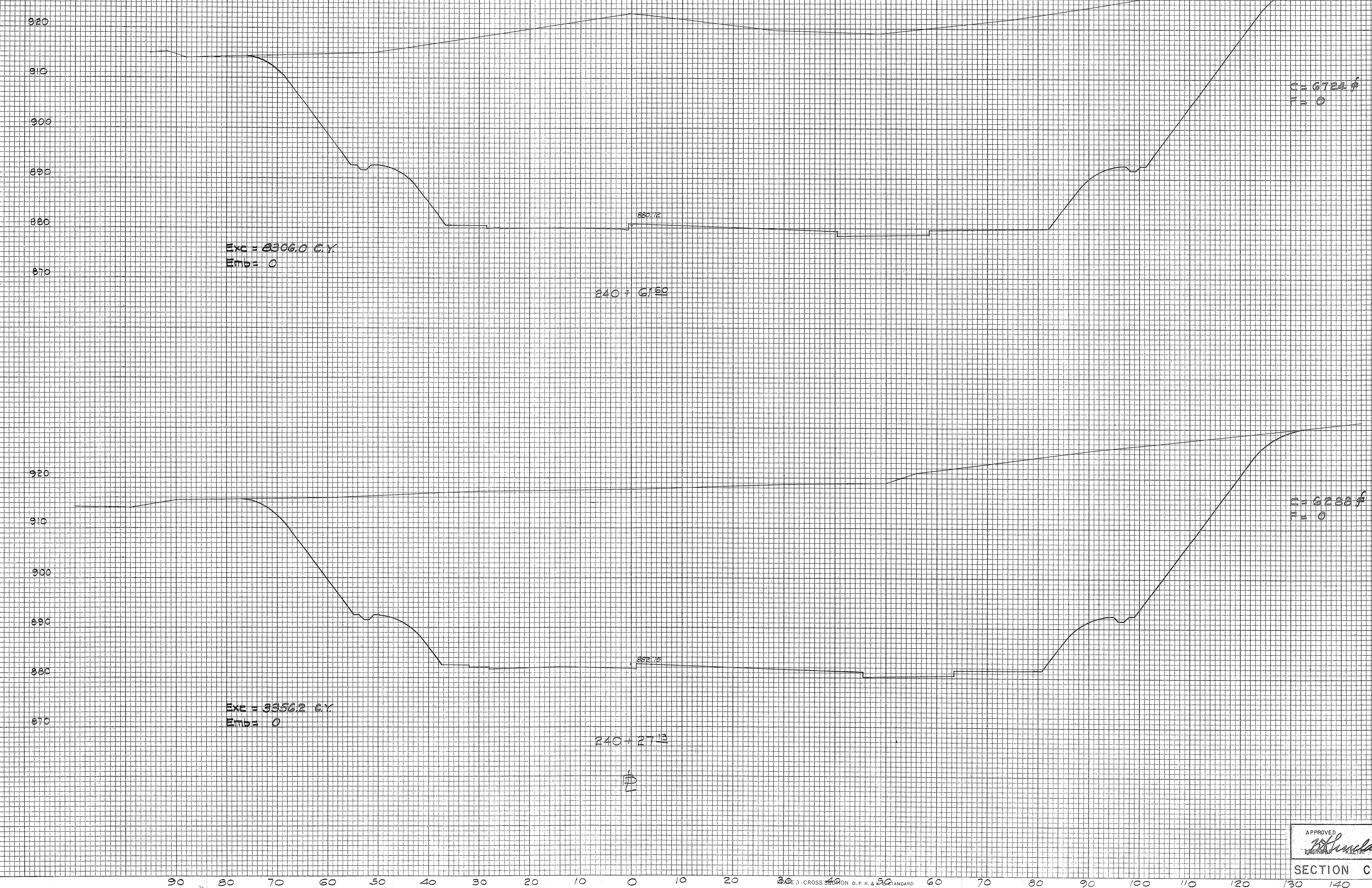
Sheet No. 31 of 252 Sheets

FILE	LOCKET	FOLDER	NO.
7	5	1	37



FINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK, PLATE, AREAS CHECKED, NO.

ORIGINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK, PLATE, AREAS CHECKED, NO.



Exc = 2356.0 C.Y.  
Emb = 0

Exc = 3356.2 C.Y.  
Emb = 0

C = 6722.7  
F = 0

C = 6288.7  
F = 0

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

### KALIHI TUNNEL KALIHI APPROACH ROAD CROSS SECTIONS

ENGINEER S.G.H.-R.M. DATE JULY 19, 1953  
DRAFTSMAN R.M. CHECKED BY S.G.H.-R.M.  
SCALE VERT. 1" = 10', HOR. 1" = 10' TRAGER H.S.  
APPROVED BY *[Signature]* APPROVED BY *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*[Signature]*  
ENGINEER KALIHI TUNNEL

W.S.	PROFILE	G.B.
GR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. R - 23

30' 3" CROSS SECTION ON O.P.R. & 30' STANDARD  
KEUFFEL & ESSER CO., NEW YORK

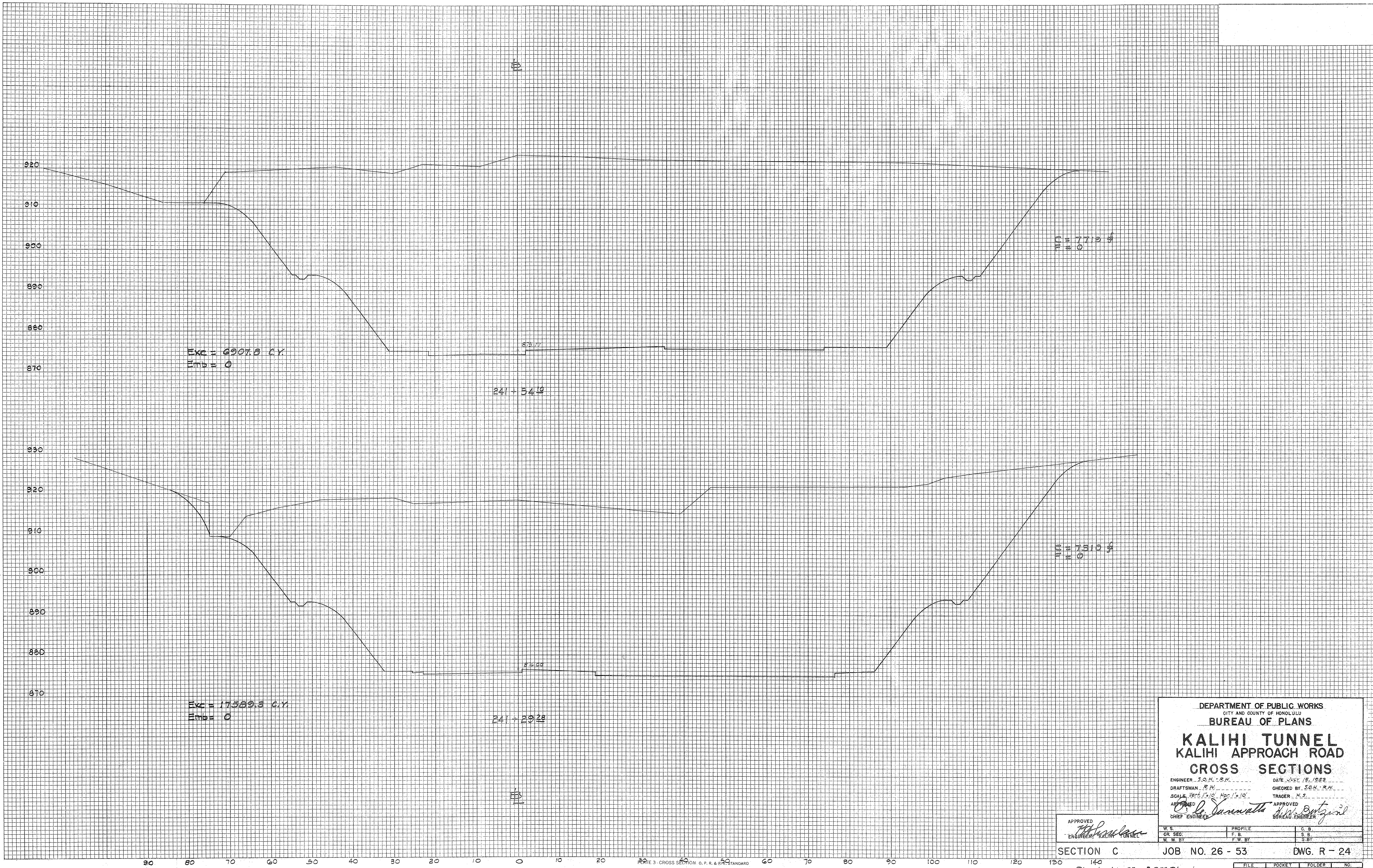
Sheet No 32 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	1	32



FINAL SURVEY PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 DATE \_\_\_\_\_

ORIGINAL SURVEY PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 DATE \_\_\_\_\_



Exc = 6907.3 C.Y.  
 Emb = 0

Exc = 17589.3 C.Y.  
 Emb = 0

241 + 54.49

241 + 29.28

NO. 7713 \$

NO. 7310 \$

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
**KALIHI APPROACH ROAD**  
**CROSS SECTIONS**  
 ENGINEER S.O.H. R.N. DATE JULY 15, 1953  
 DRAFTSMAN R.W. CHECKED BY S.O.H. R.N.  
 SCALES Vert. 1"=10' Hor. 1"=10'  
 TRACER H.S.  
 APPROVED *[Signature]* APPROVED *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
 ENGINEER KALIHI TUNNEL

W.S.	PROFILE	C.B.
OR. SEC.	F.S.	S.B.
W.M. BY	F.W. BY	S.B.Y.

SECTION C JOB NO. 26 - 53 DWG. R - 24

Sheet No. 33 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	1	33

SECTION C - CROSS SECTION O. P. R. & R. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK.



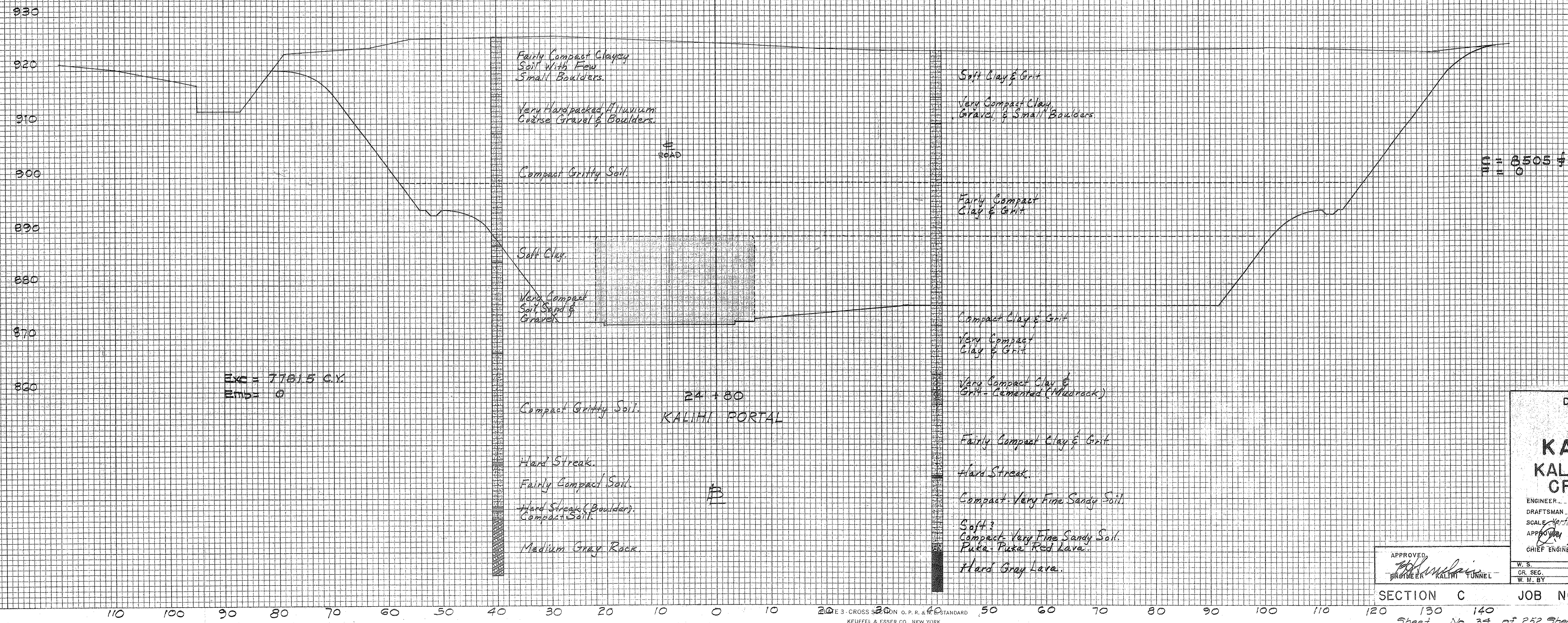
FINAL SURVEY PLOTTED TEMPLATE AREAS CHECKED. DATE BY

ORIGINAL SURVEY PLOTTED TEMPLATE AREAS CHECKED. DATE BY

7,300 C.Y. to be excavated behind Portal Yardage to be part of Road Excavation.

**EARTHWORK SUMMARY**

EXC.	127,705.1
EMB.	36,080.5
+15%	5,406.1
TOTAL EMB.	41,486.6



Exc = 7761.5 C.Y.  
Emb = 0

24+80  
KALIHI PORTAL

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

**KALIHI TUNNEL**  
KALIHI APPROACH ROAD  
CROSS SECTIONS

ENGINEER: S.O.H. - R.M. DATE: July 19, 1932  
DRAFTSMAN: R.M. CHECKED BY: S.O.H. - R.M.  
SCALE: Horiz. 1"=10' Vert. 1"=10'  
TRAGER: H.S.  
APPROVED: *[Signature]*  
CHIEF ENGINEER: *[Signature]* BUREAU ENGINEER

APPROVED	PROFILE	C.B.
<i>[Signature]</i>	F. B.	S. B.
ENGINEER KALIHI TUNNEL	F. W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. R - 25

Sheet No. 34 of 252 Sheets

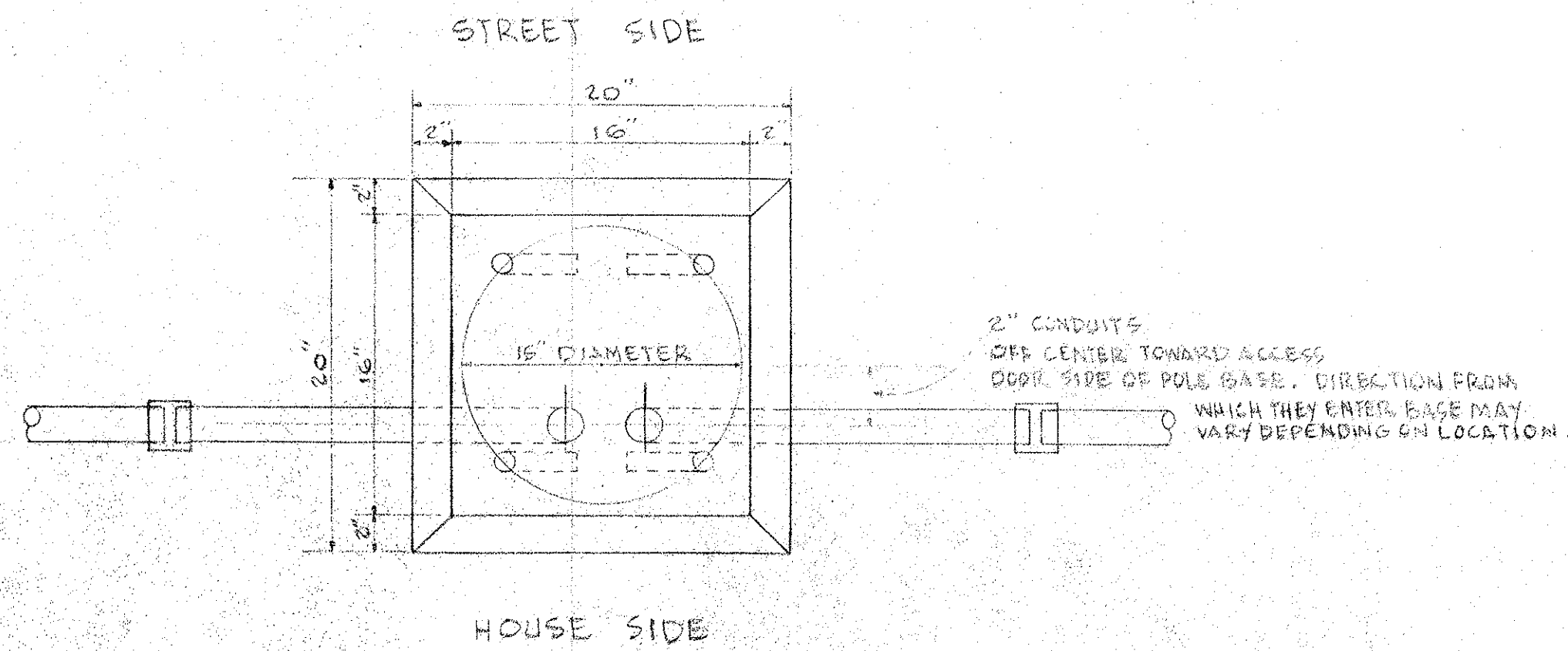
FILE	POCKET	FOLDER	NO.
7	5	1	34

20' E 3 - CROSS SECTION O. P. R. & 40' STANDARD KEUFFEL & ESSER CO., NEW YORK.



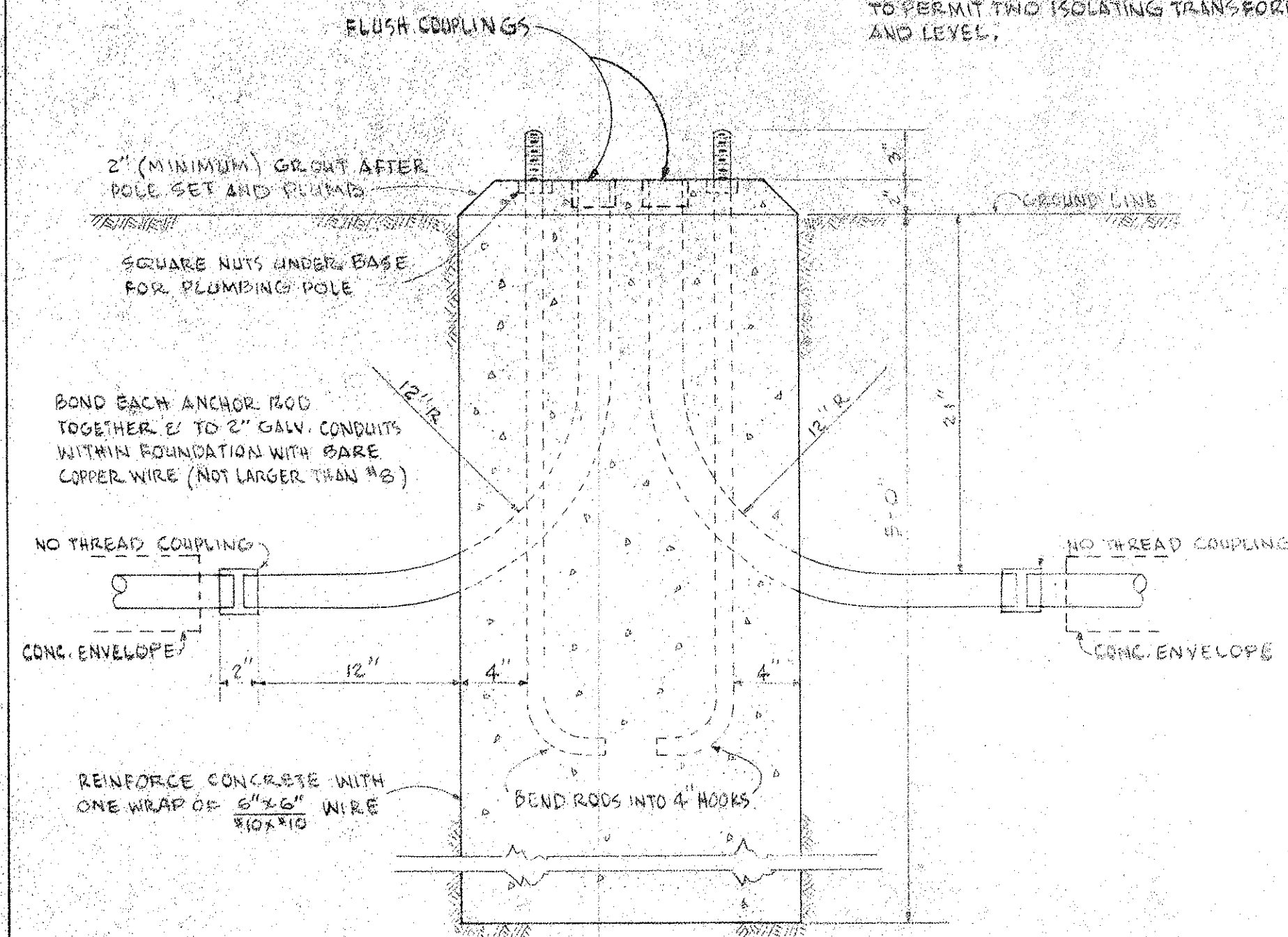




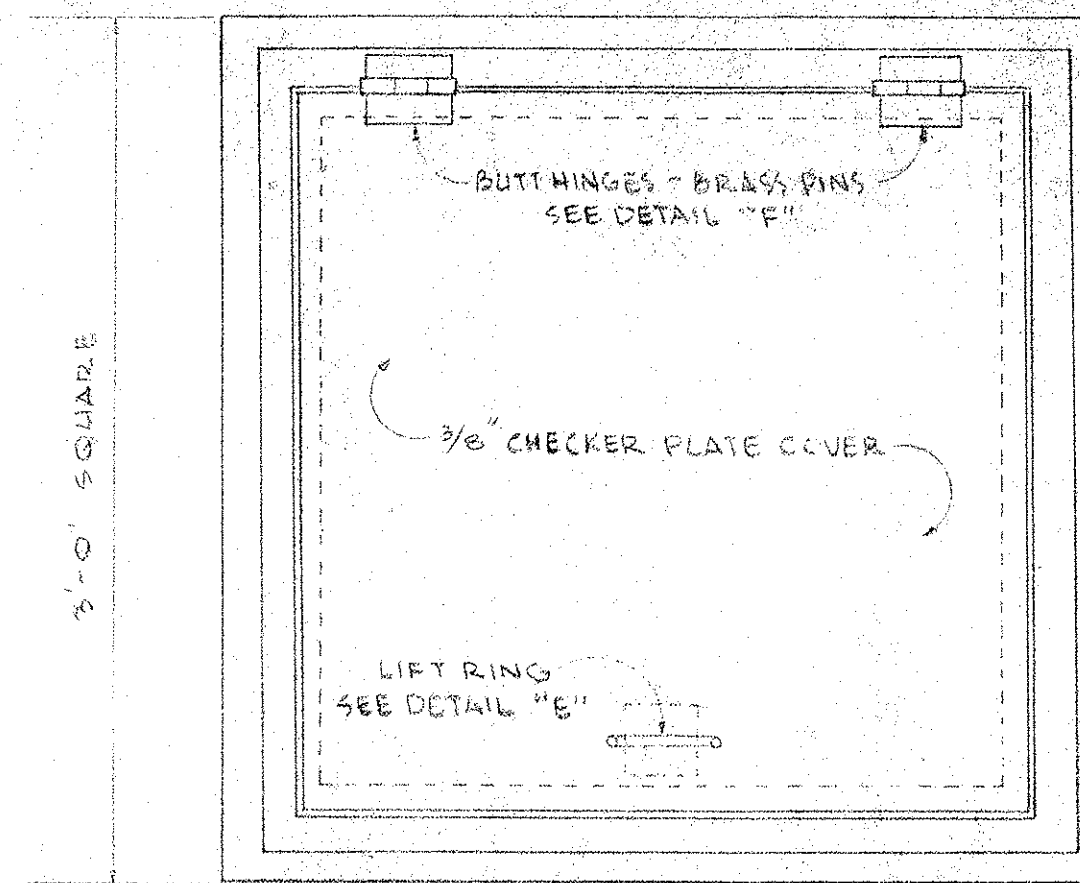


ALL DIMENSIONS OF FOUNDATION SHALL BE APPROVED BY SUPPLIER OF LAMP POST.

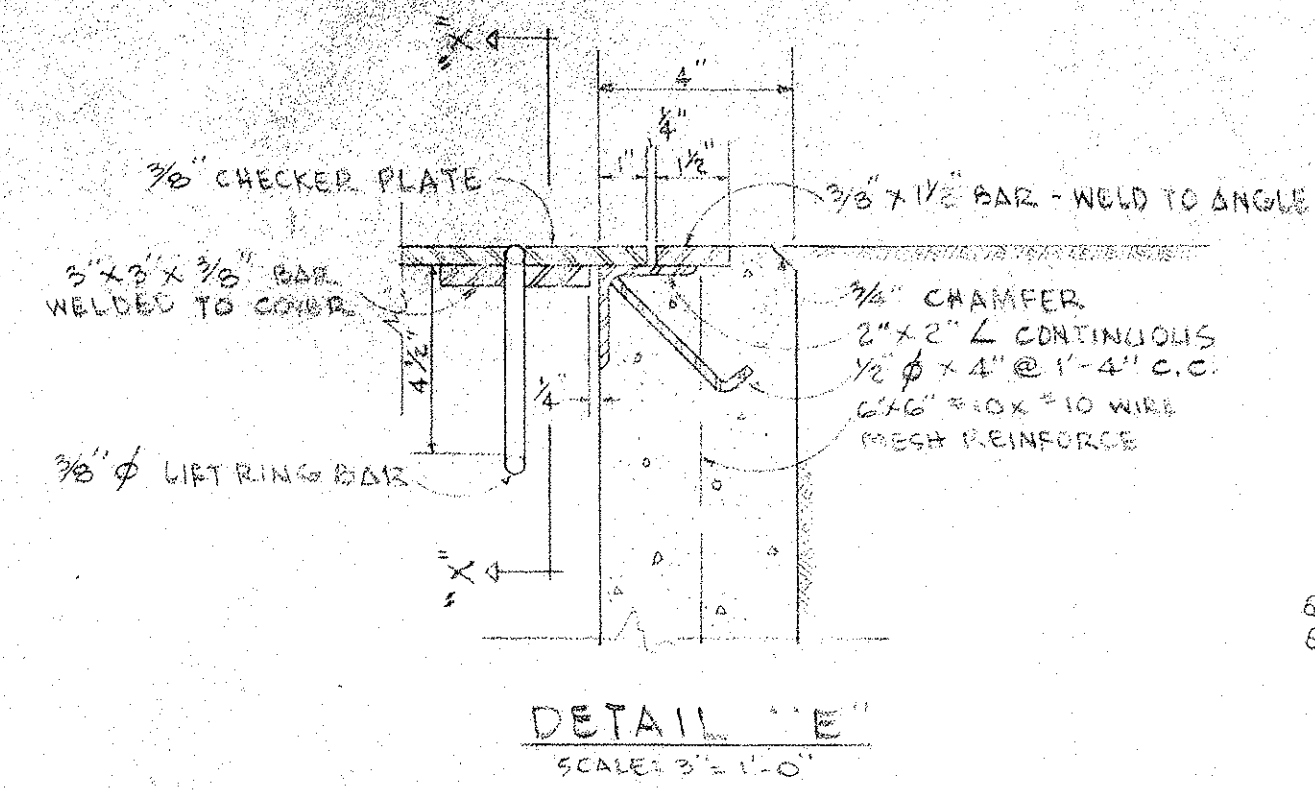
AFTER APPROVAL OF LAMP POST AND ISOLATING TRANSFORMER, CONTRACTOR SHALL PROVIDE SHOP DRAWING FOR APPROVAL OF ENGINEER OF LOCATION IN BASE OF ENTERING 2" CONDUITS AND TWO ISOLATING TRANSFORMERS. GROUTING MAY BE USED AS NECESSARY INSIDE BASE TO PERMIT TWO ISOLATING TRANSFORMERS TO SET FIRM AND LEVEL.



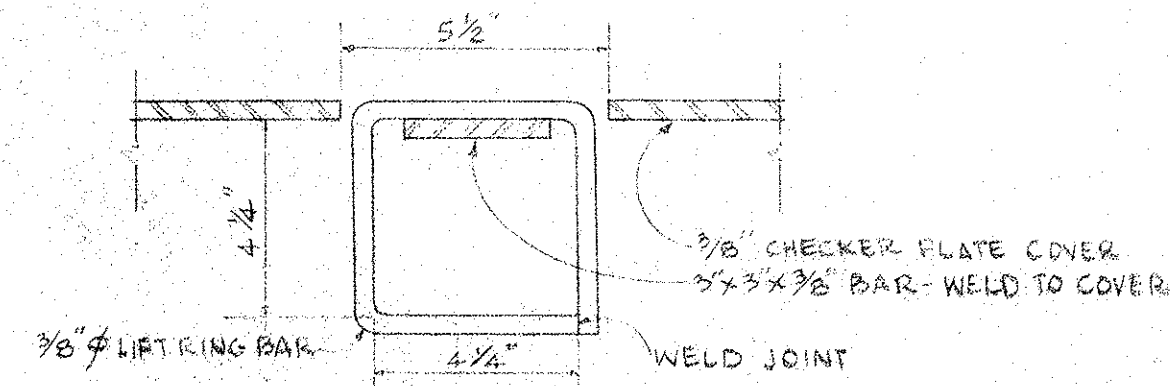
CONCRETE FOUNDATION FOR METAL LAMP POST  
SCALE: 1/2" = 1'-0"



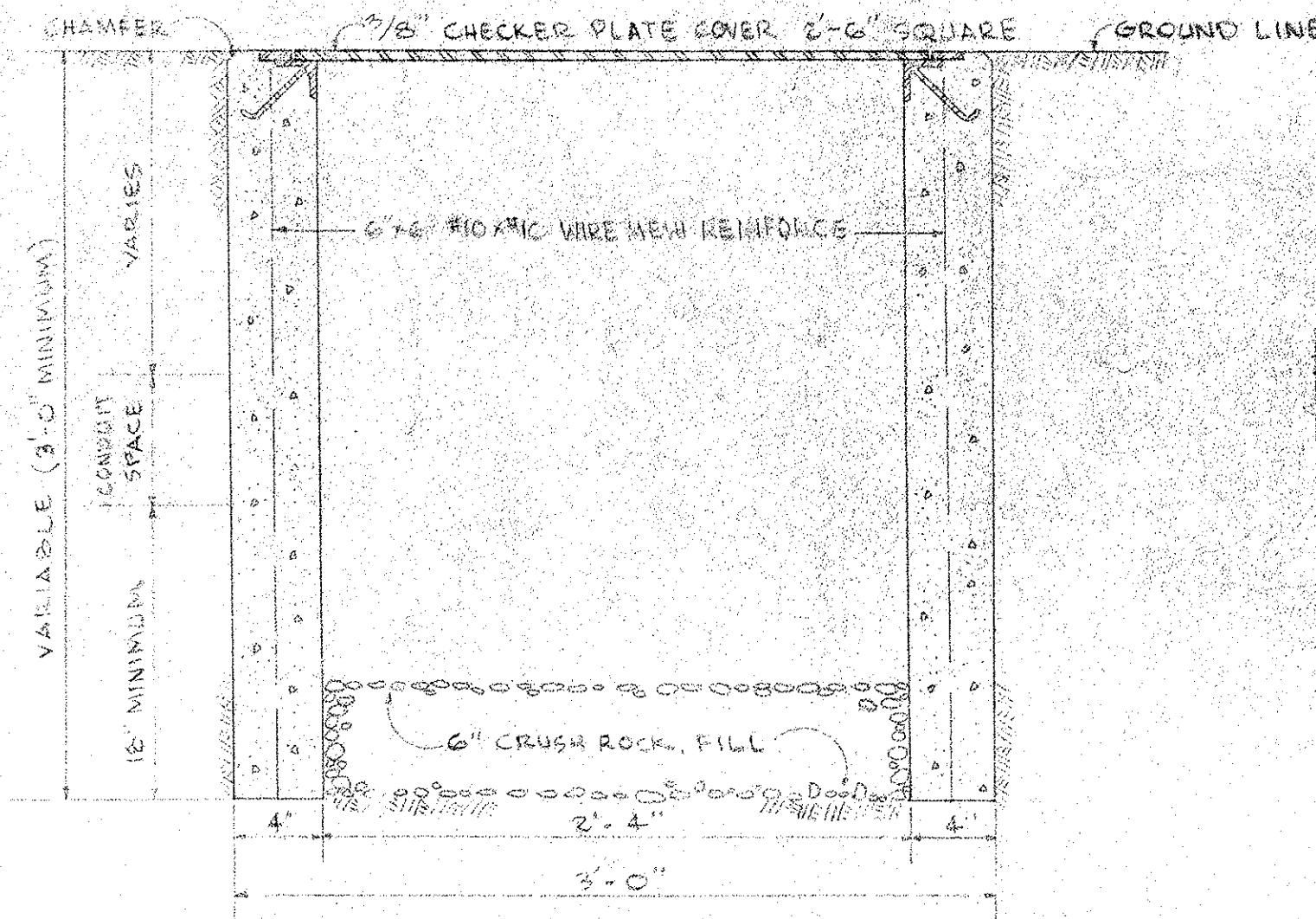
TYPICAL PLAN  
SCALE: 1/2" = 1'-0"



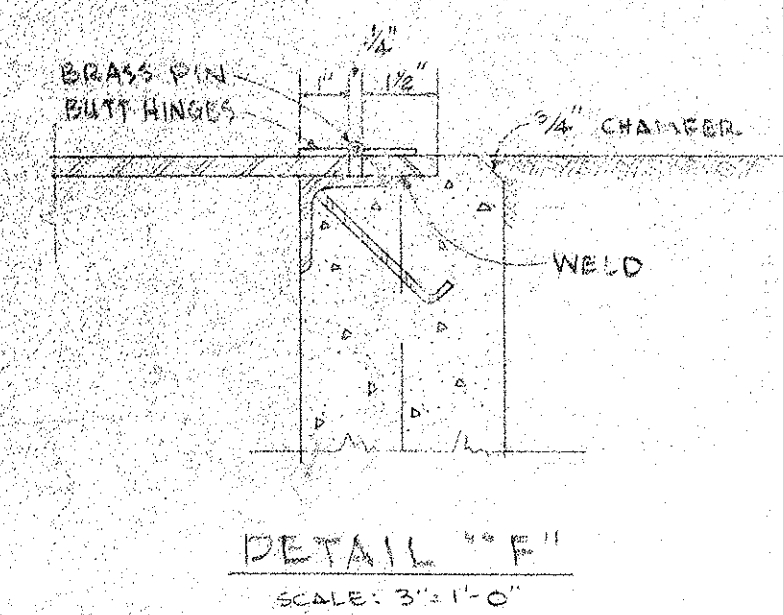
DETAIL "E"  
SCALE: 3/4" = 1'-0"



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

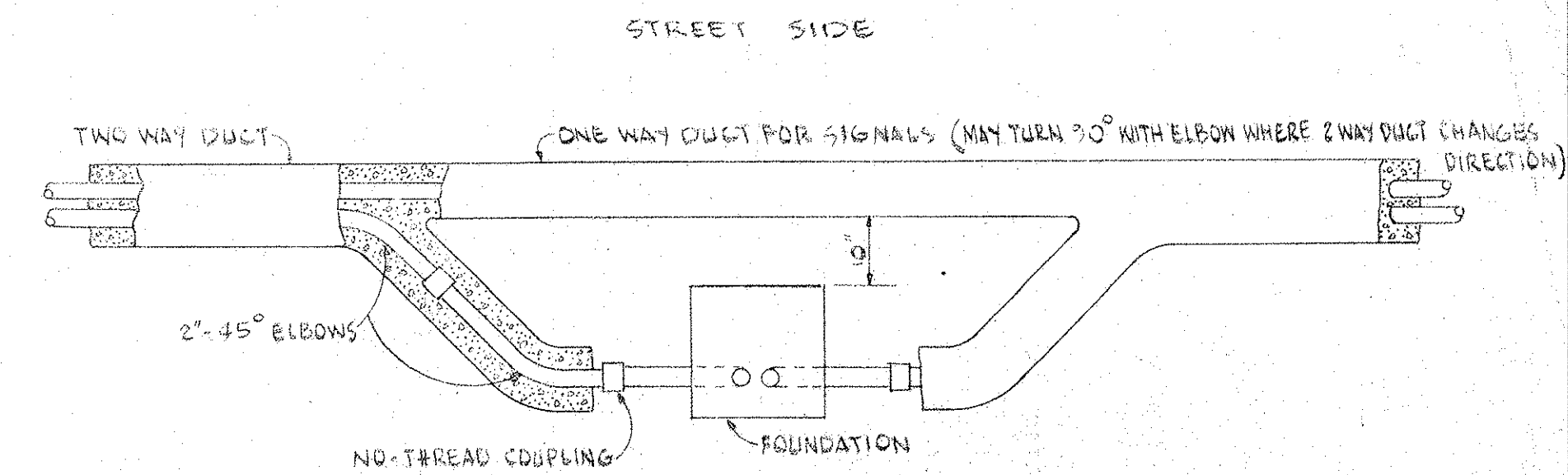


TYPICAL SECTION  
SCALE: 1/2" = 1'-0"

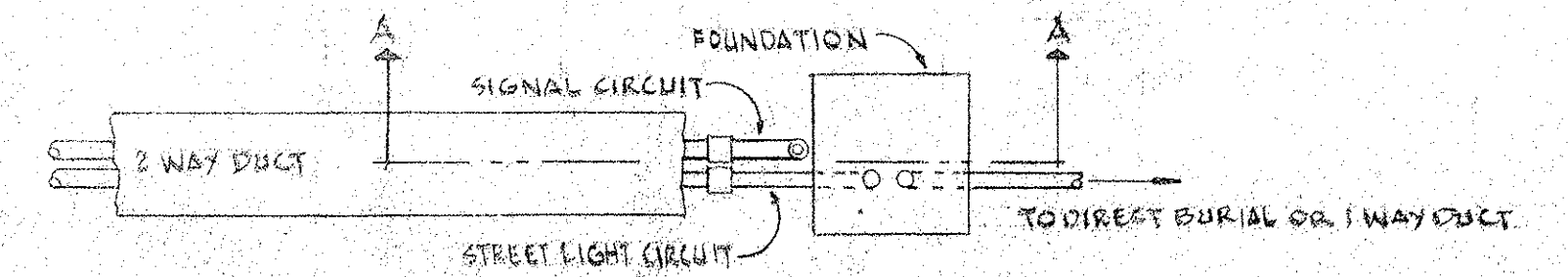


DETAIL "F"  
SCALE: 3/4" = 1'-0"

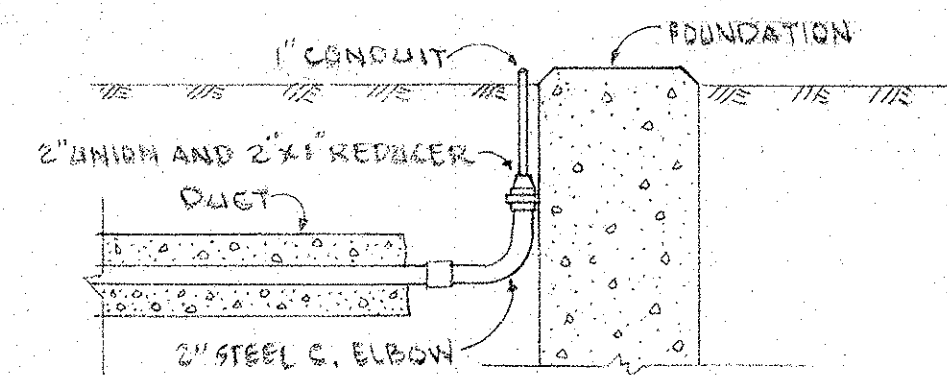
TYPICAL HANDHOLE DETAILS



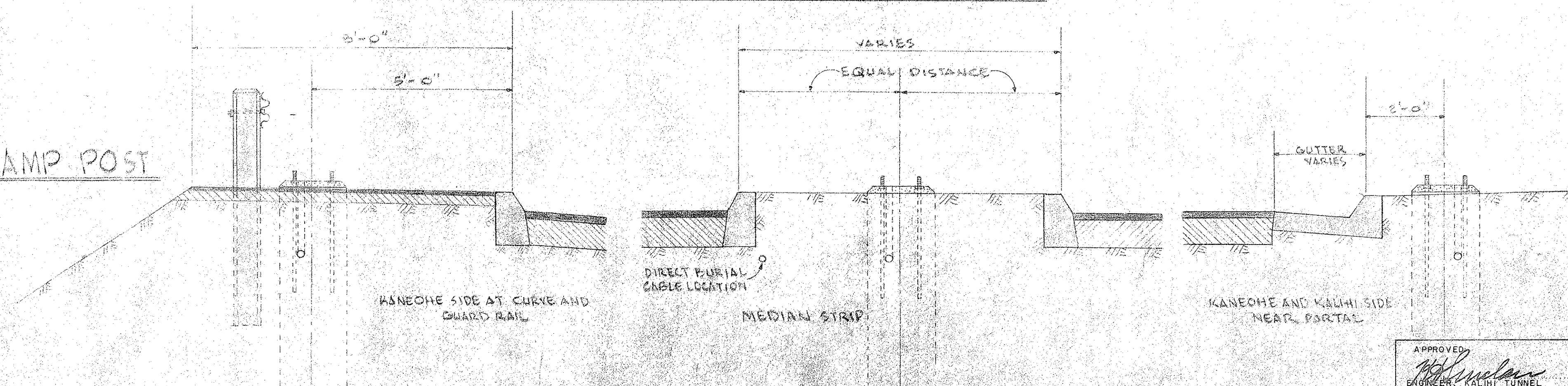
TYPICAL DUCT TRANSITION AT LAMP POST FOUNDATION



TERMINATION OF 2 WAY DUCT WHERE SIGNAL OR PHOTOELECTRIC DEVICE IS INSTALLED ON LAMP POST



SECTION "A-A"



TYPICAL METAL LAMP POST FOUNDATION LOCATIONS

LAW & WILSON  
ARCHITECTS & ENGINEERS  
DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
KALIHI APPROACH ROAD  
ROADWAY LIGHTING DETAILS

ENGINEER: L. B. W. DATE: JULY 15, 1958  
DRAFTSMAN: S. H. P. CHECKED BY: J. D. [Signature]  
SCALE: AS NOTED TRACER: [Signature]  
APPROVED: [Signature] CHIEF ENGINEER  
APPROVED: [Signature] BUREAU ENGINEER

W. S.	PROFILE	C. D.
CR. SEC.	E. P.	S. P.
W. M. BY	F. W. BY	S. BY

SECTION C JOB NO. 26-53 DWG. R-27





W-1  
30" x 30"



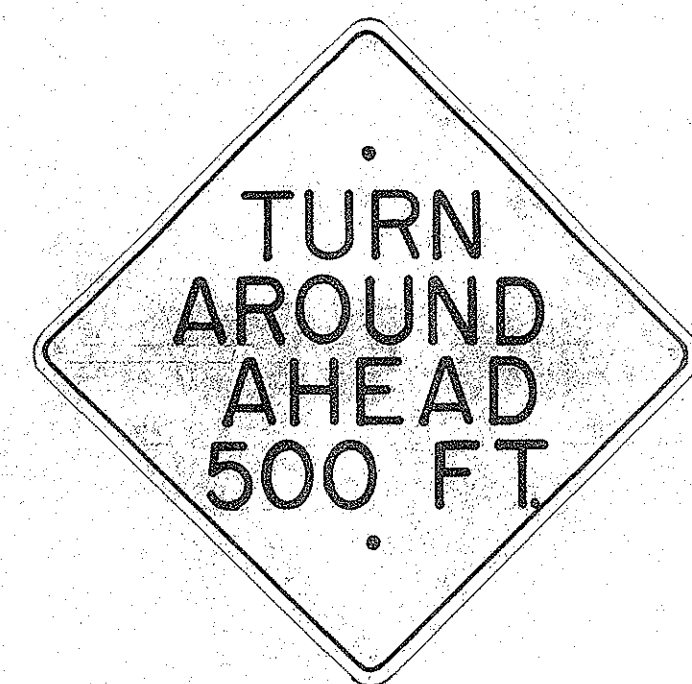
\* W-2  
30" x 30"



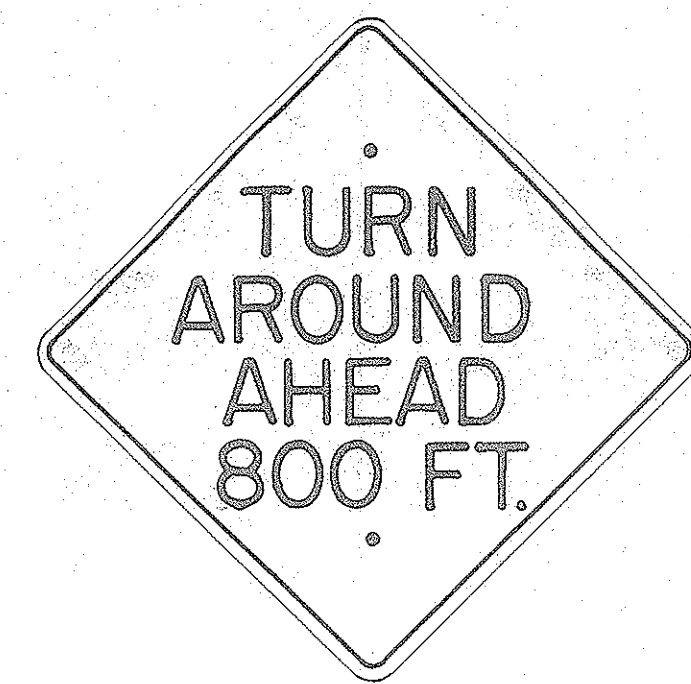
\* W-3  
30" x 30"



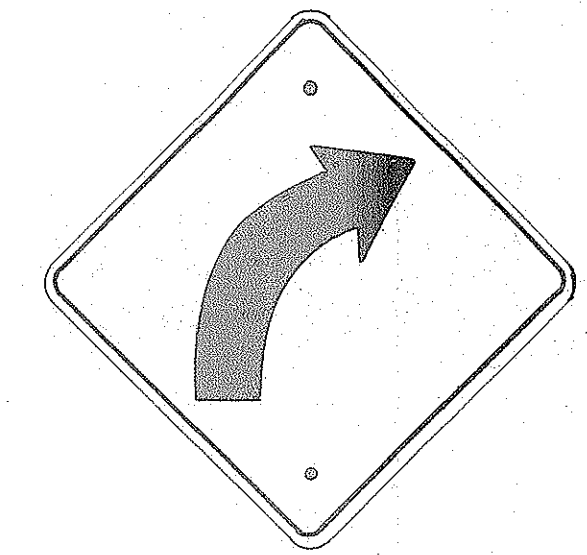
W-4  
30" x 30"



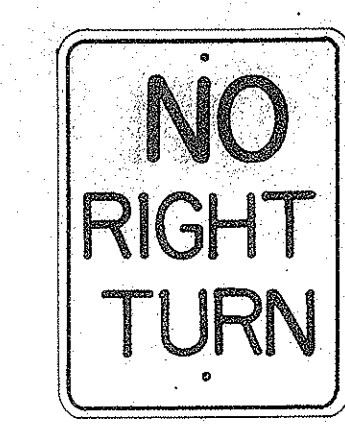
W-5  
30" x 30"



W-6  
30" x 30"



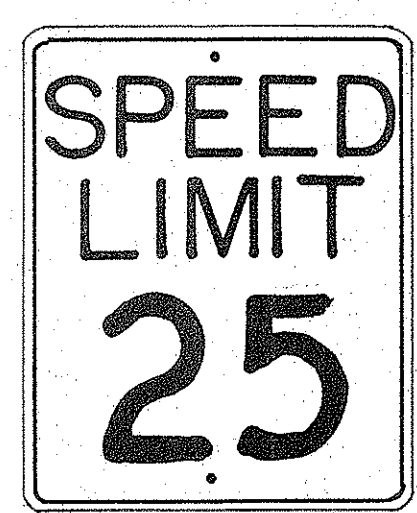
\* W-7  
24" x 24"



R-1  
18" x 24"



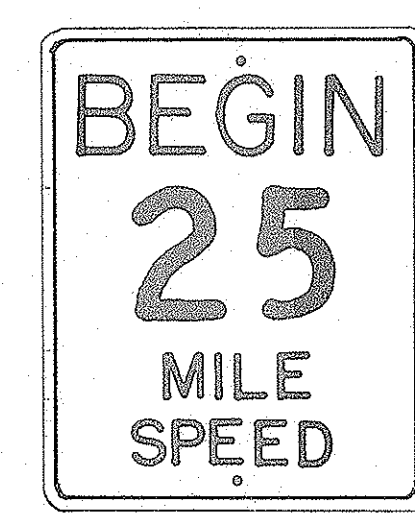
R-2  
18" x 24"



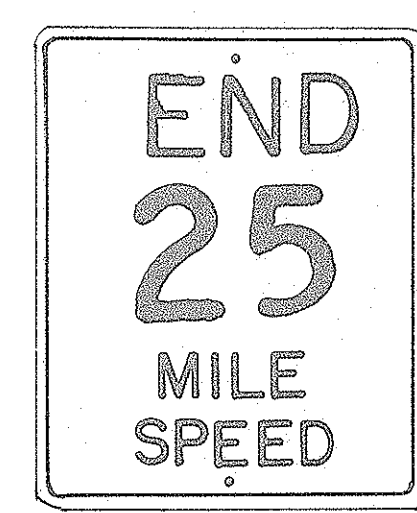
R-3  
24" x 30"



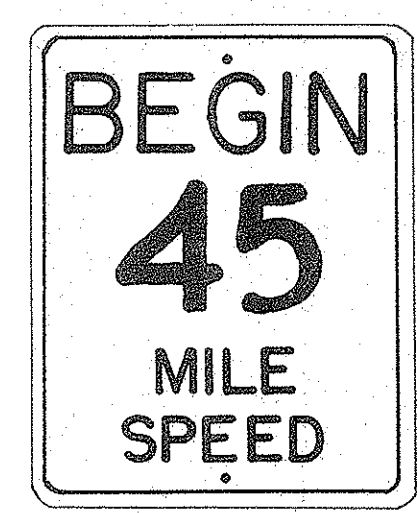
R-4  
24" x 30"



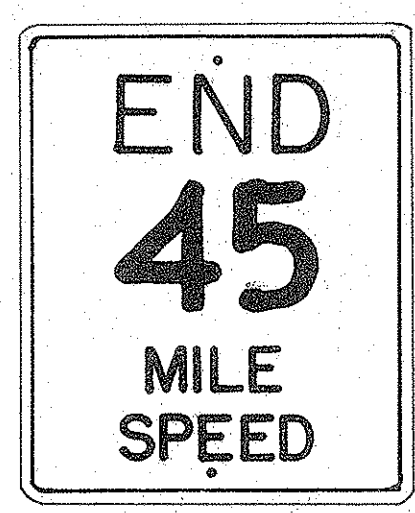
R-5  
24" x 30"



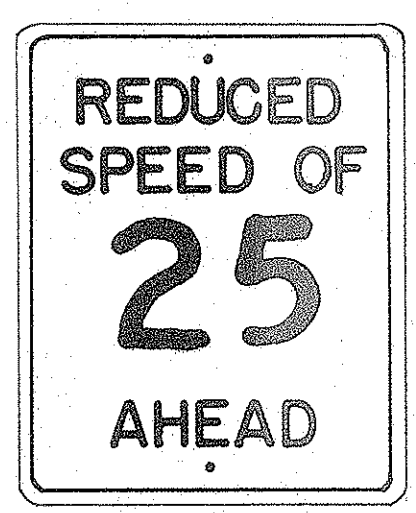
R-6  
24" x 30"



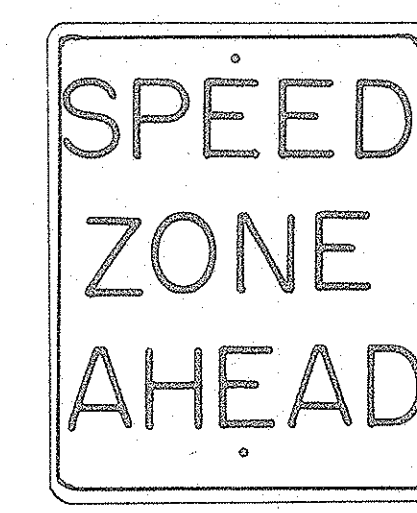
R-7  
24" x 30"



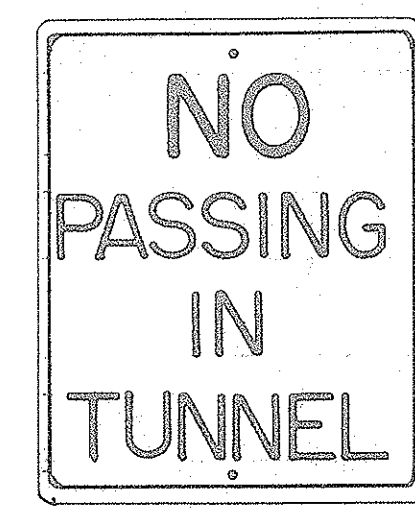
R-8  
24" x 30"



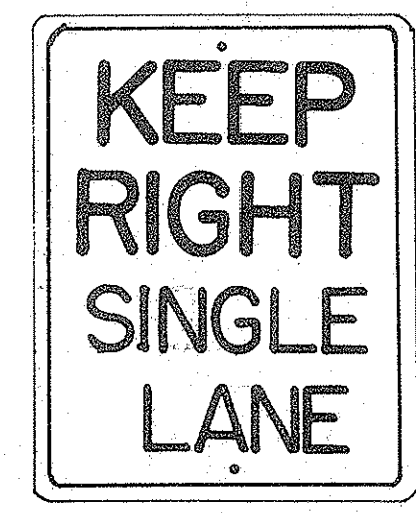
R-9  
24" x 30"



R-10  
24" x 30"



R-11  
24" x 30"



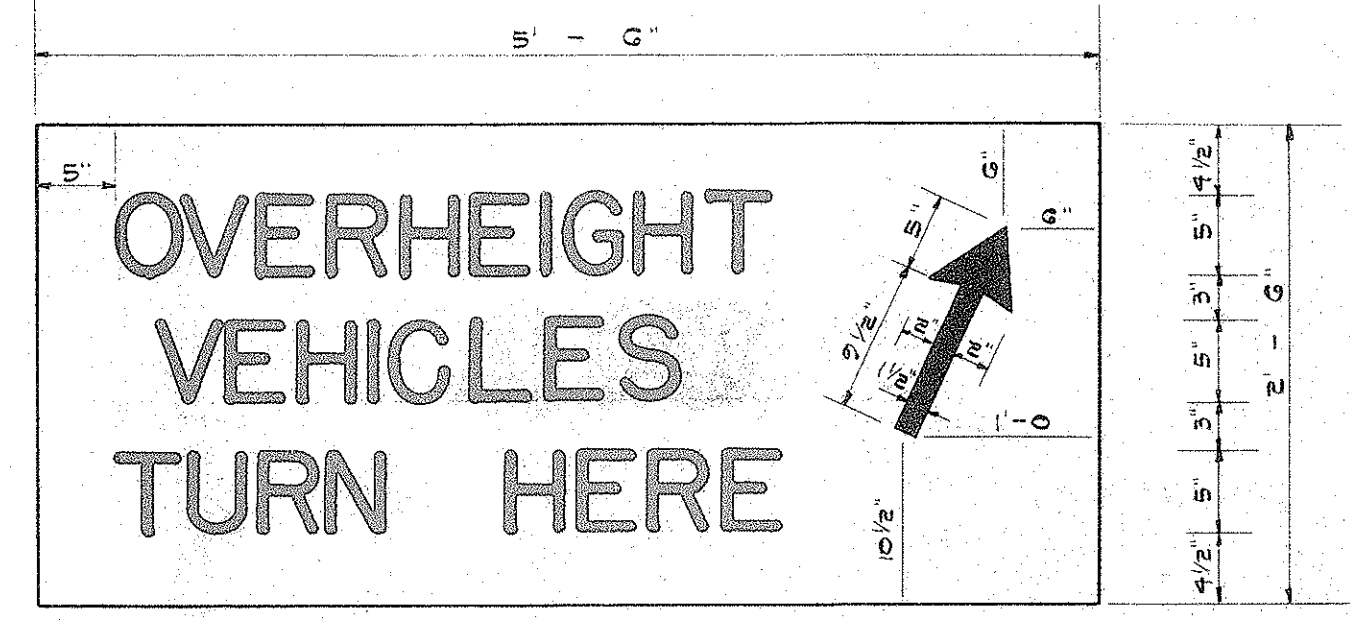
R-12  
24" x 30"



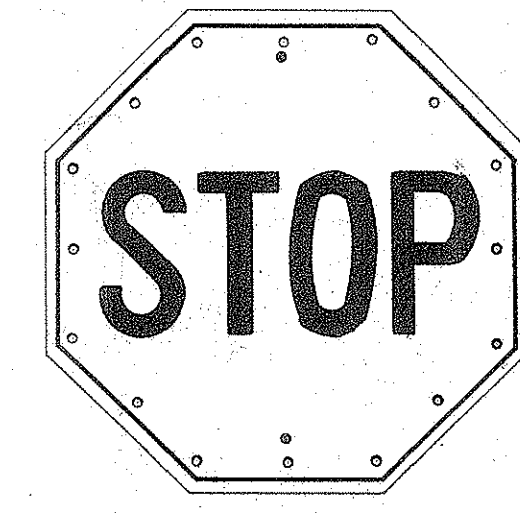
R-13  
24" x 24"



W-8  
NOT IN CONTRACT



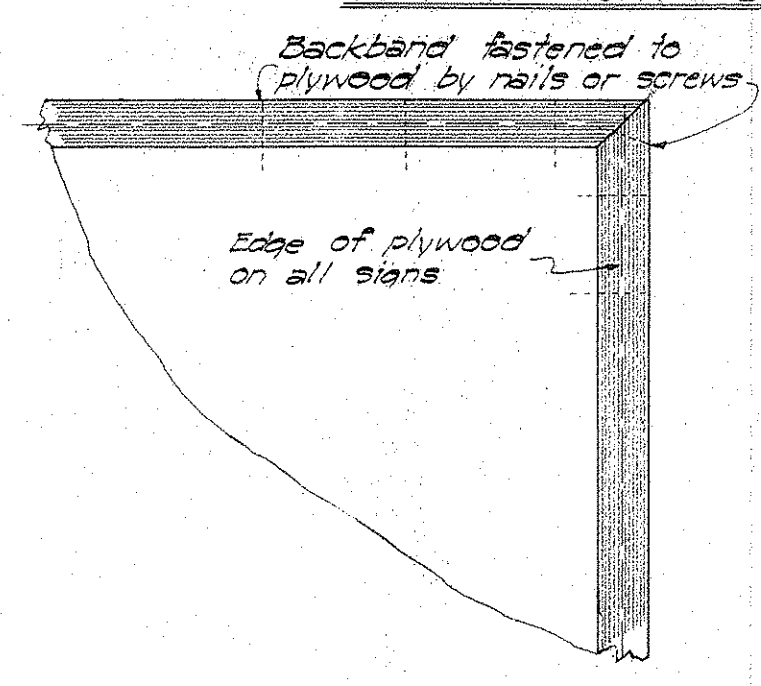
NOT IN CONTRACT { R-16 R  
R-16 L (Arrow pointing to left)



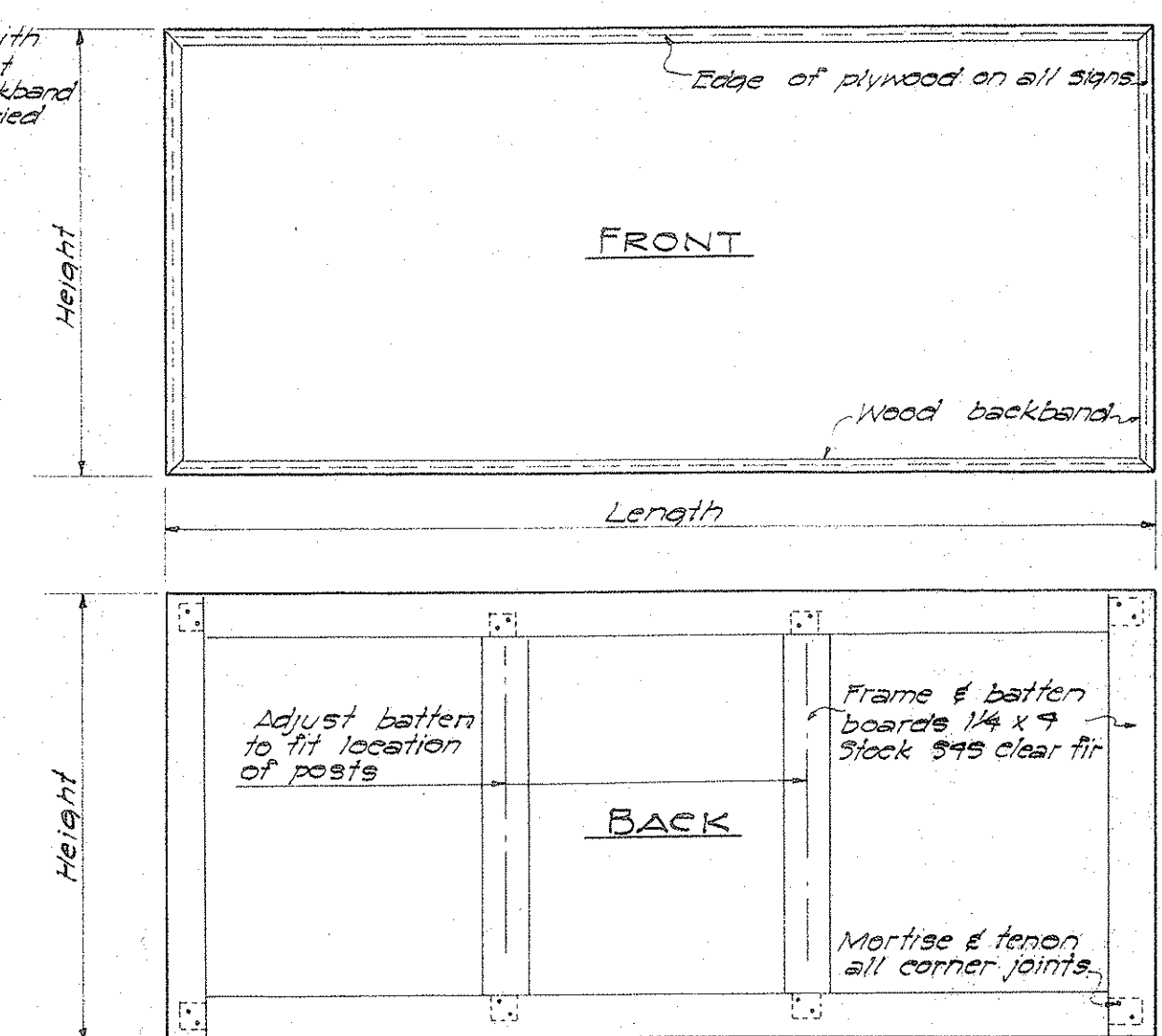
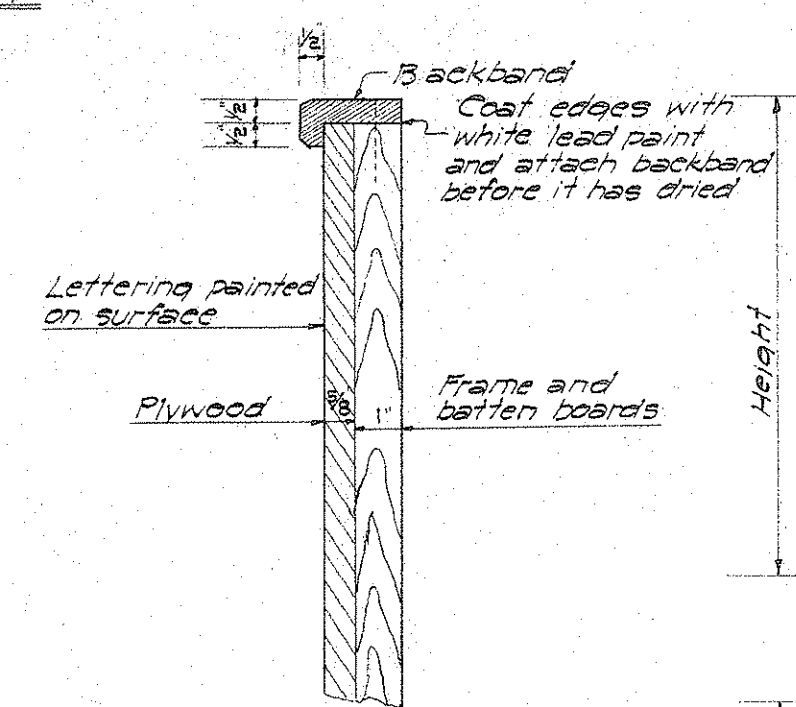
\* R-14  
30" x 30"



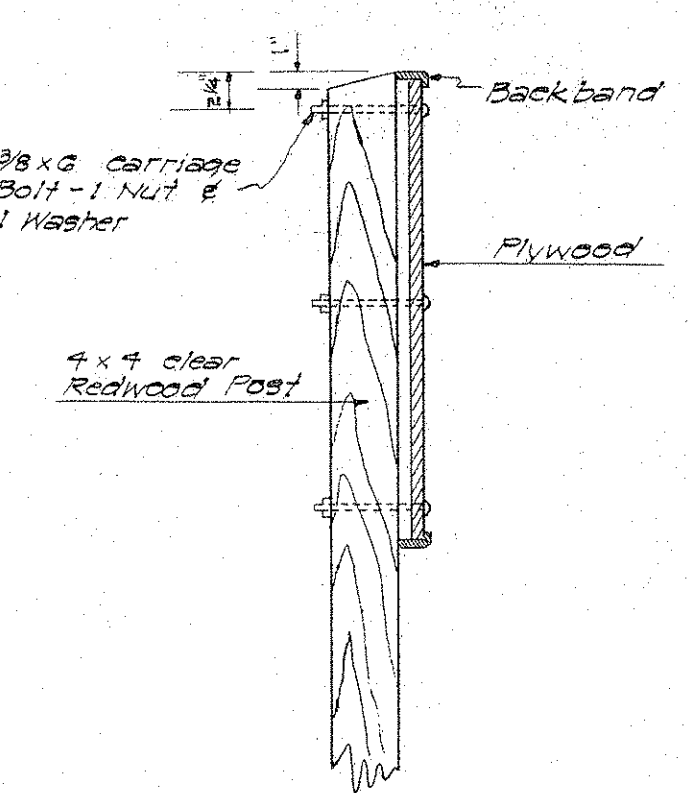
R-15  
24" x 24"



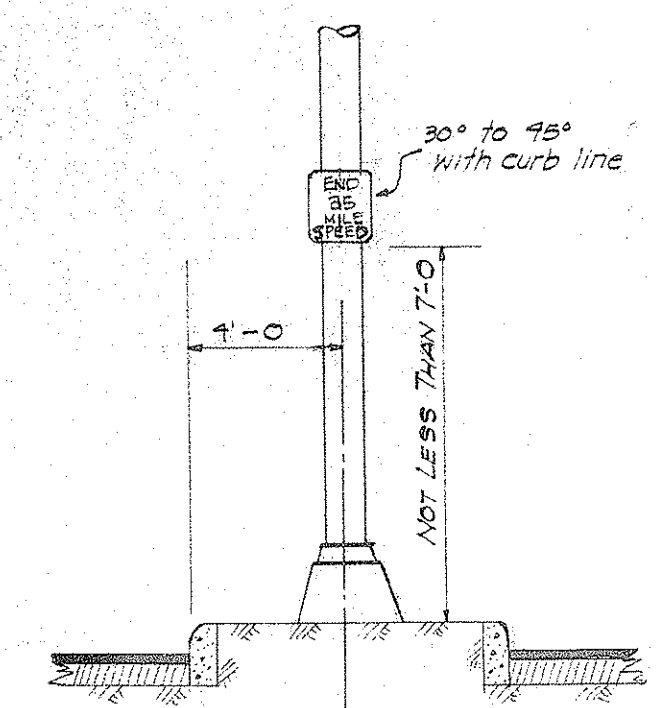
DETAIL OF BACKBAND  
Scale: 1" = 3'-0"



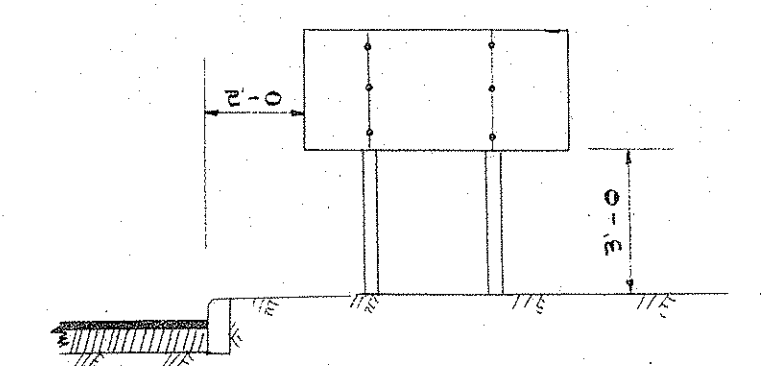
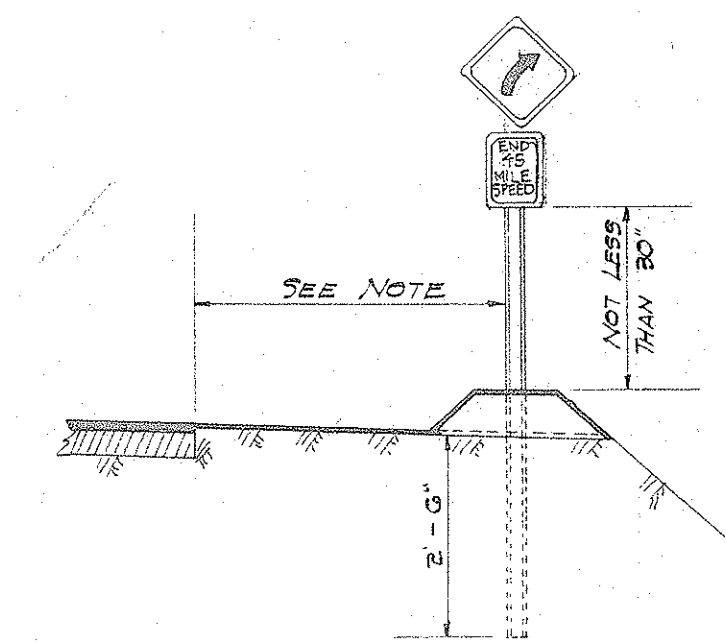
DIMENSION OF SIGNS  
Scale: 1" = 1'-0"



ATTACHMENT OF SIGN TO POSTS



TYPICAL INSTALLATIONS  
HEIGHT AND LATERAL LOCATION OF SIGNS



NOTE: All signs shall be placed at edge of shoulder, center of median strip, and as shown on the plans and/or as ordered by the Engineer.  
All letters and figures shall be of size and design shown and shall conform with "Standard Alphabets for Highway Signs" as set forth by the Public Roads Administration, Federal Works Agency. Series "C" letters and series "D" numerals shall be used except where noted.  
All regulatory (R) signs shall have black letters on white background except where noted. All warning (W) signs shall have black letters or figures on a "Highway Yellow" background.  
\* Signs shall have white reflector buttons in letters, figures, and around edges.  
See Specifications for materials, finish, and standard lamp post clamps for traffic signs.

APPROVED  
ENGINEER, KALIHI TUNNEL

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
REGULATORY & WARNING SIGNS

ENGINEER: S.O.H. DATE: JULY 18, 1958  
DRAFTSMAN: J.S. CHECKED BY: S.O.H.-R.W.  
SCALE: AS SHOWN TRACER: J.S.  
APPROVED: S.O.H. CHIEF ENGINEER APPROVED: H.W. Butzger SURVEAU ENGINEER

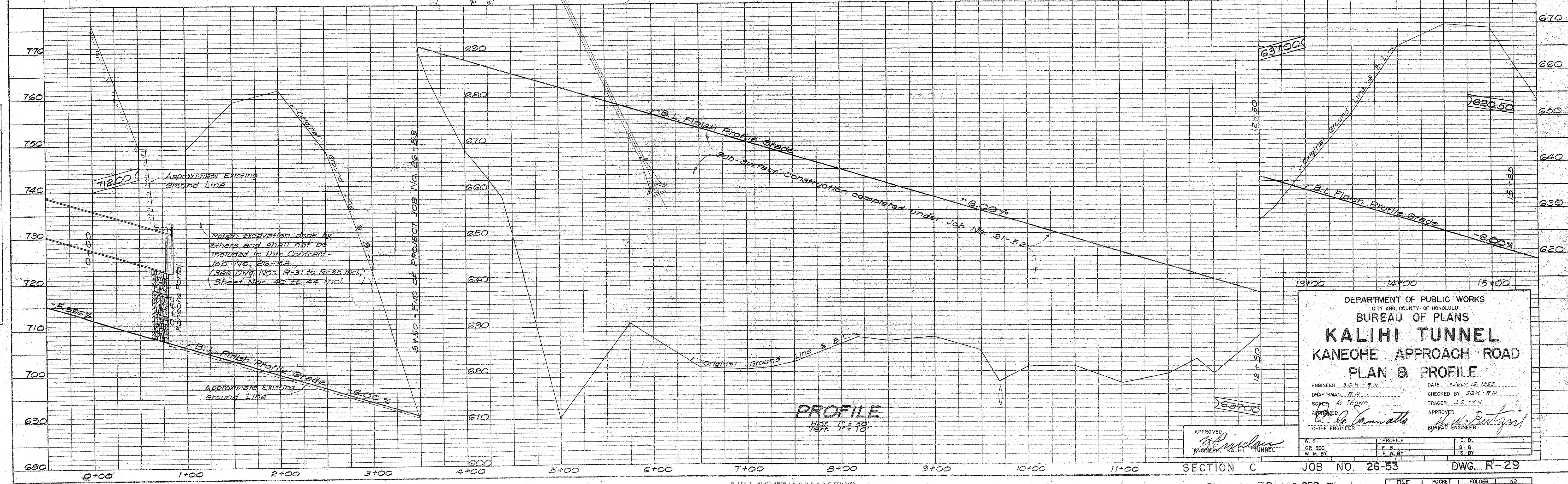
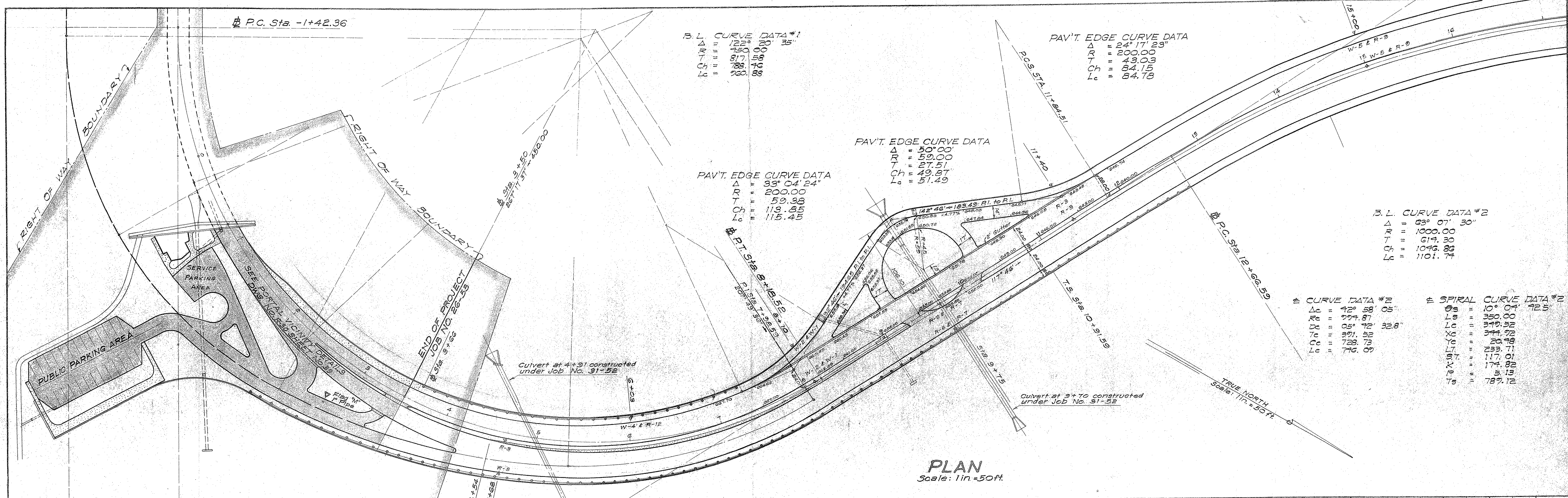
W.S.	PROFILE	C.B.
C.R. SEC.	F.H.	S.B.
W.M. BY	F.W. BY	S.B.Y.

SECTION C JOB NO. 26-53 DWG. R-28



PLAN	SURVEYED	BY	DATE
	NOTED		
	ALIGNED		
	CHECKED		
	RT. OF WAY		
	CHECKED		
	NO.		

PROFILE	SURVEYED	BY	DATE
	PLOTTED		
	CHECKED		
	STRUCTURE		
	NOTATIONS		
	CHKD.		
	NO.		



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KANEOHE APPROACH ROAD  
 PLAN & PROFILE

ENGINEER: S.O.M.: R.W. DATE: JULY 15, 1953  
 DRAFTSMAN: R.M. CHECKED BY: S.O.M.: R.W.  
 SCALER: As Shown TRACER: J.S.: Y.N.  
 APPROVED: *S. O. M. R. W.* APPROVED: *J. S. Y. N.*  
 CHIEF ENGINEER: *S. O. M. R. W.* CHIEF ENGINEER: *J. S. Y. N.*

APPROVED	PROFILE	C. B.
<i>S. O. M. R. W.</i>	F. B.	S. B.
ENGINEER, KALIHI TUNNEL	W. M. BY	S. BY

SECTION C JOB NO. 26-53 DWG. R-29

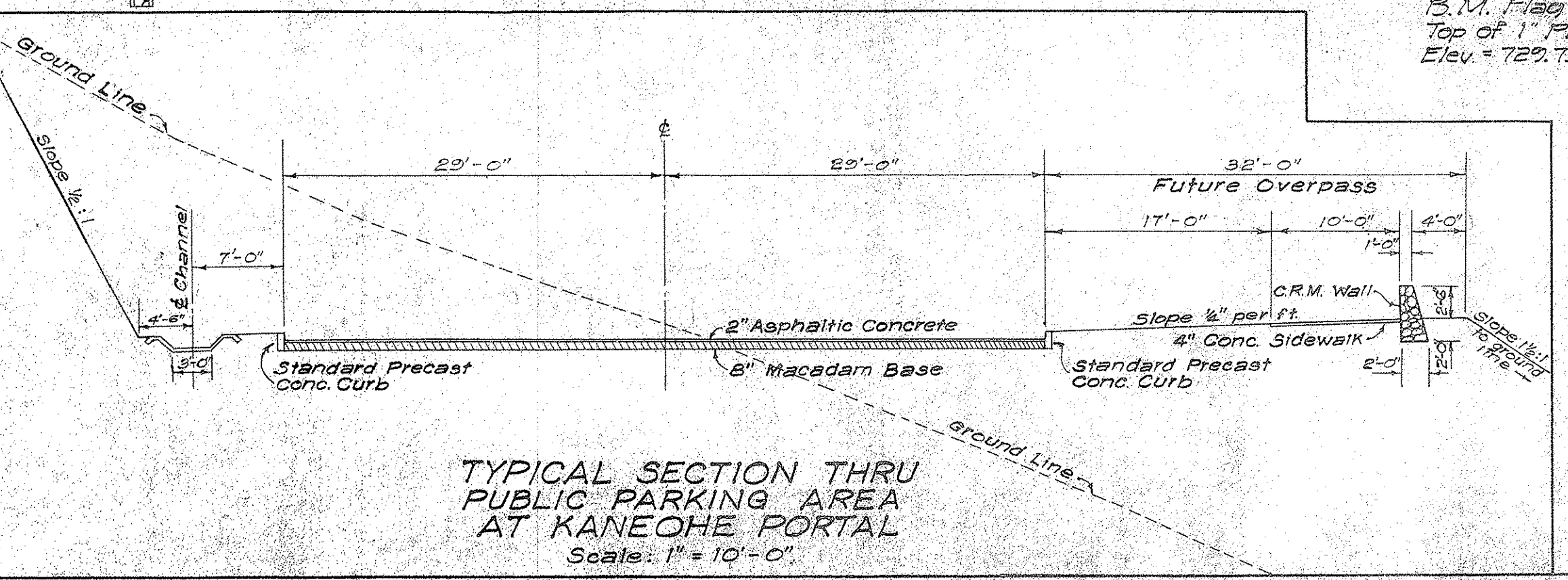
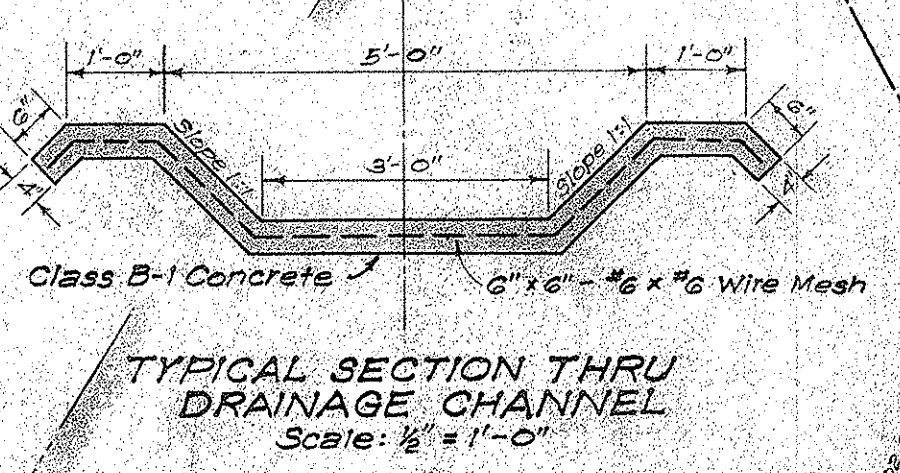
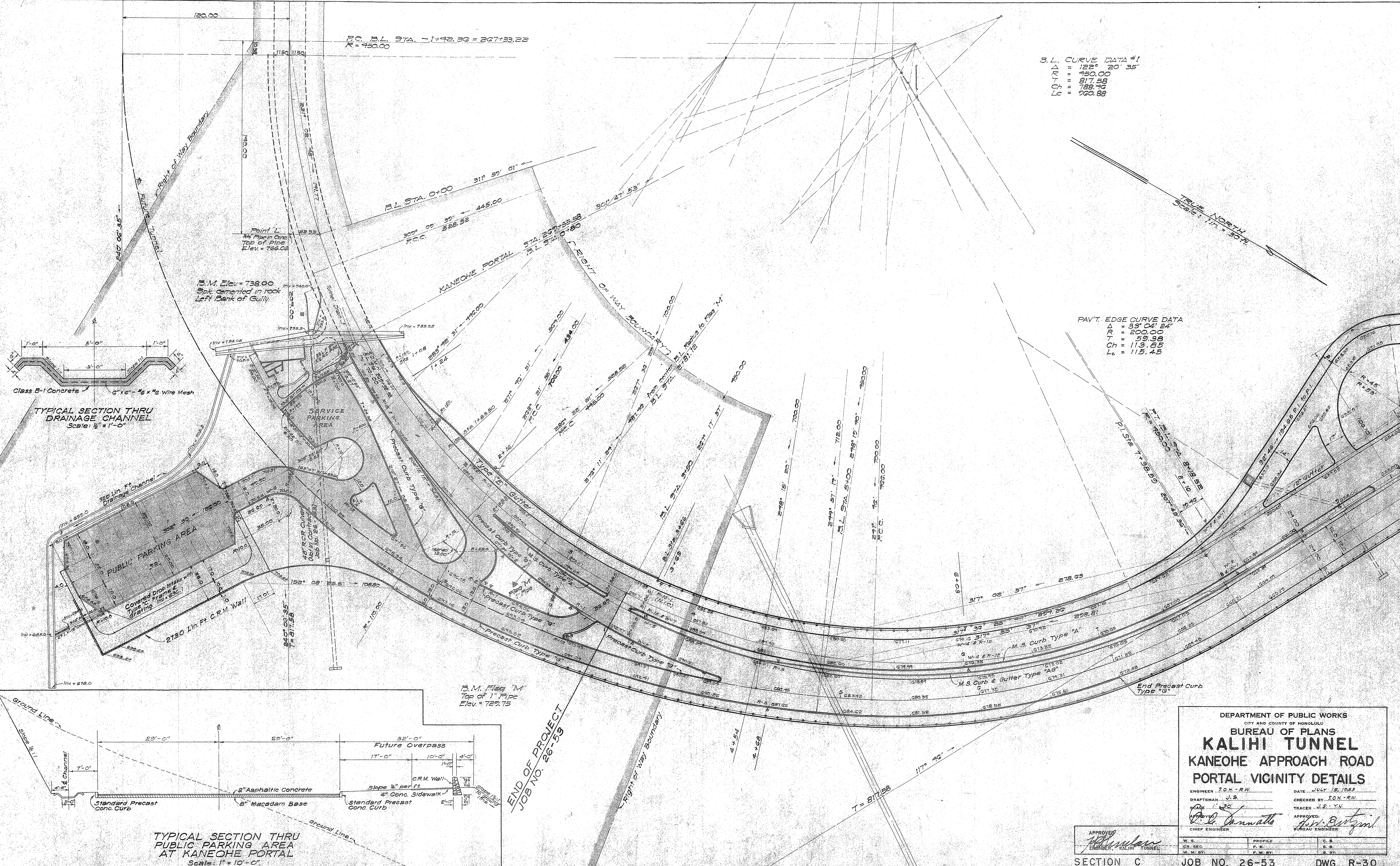
FILE	POCKET	FOLDER	NO.
7	5	2	1



B.L. CURVE DATA #1  
 Δ = 122° 20' 35"  
 RT = 450.00  
 TL = 317.58  
 CL = 188.46  
 LC = 900.88

PAV'T. EDGE CURVE DATA  
 Δ = 33° 04' 24"  
 RT = 200.00  
 TL = 59.98  
 CL = 113.85  
 LC = 113.45

TRUE NORTH  
 Scale: 1" = 30'



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
**KANEOHE APPROACH ROAD**  
**PORTAL VICINITY DETAILS**

ENGINEER: S.O.H.-R.W. DATE: JULY 15, 1952  
 DRAFTSMAN: J.S. CHECKED BY: S.O.H.-R.W.  
 SCALE: 1" = 30' TRACER: J.S. Y.N.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

SECTION C JOB NO. 26-53 DWG. R-30

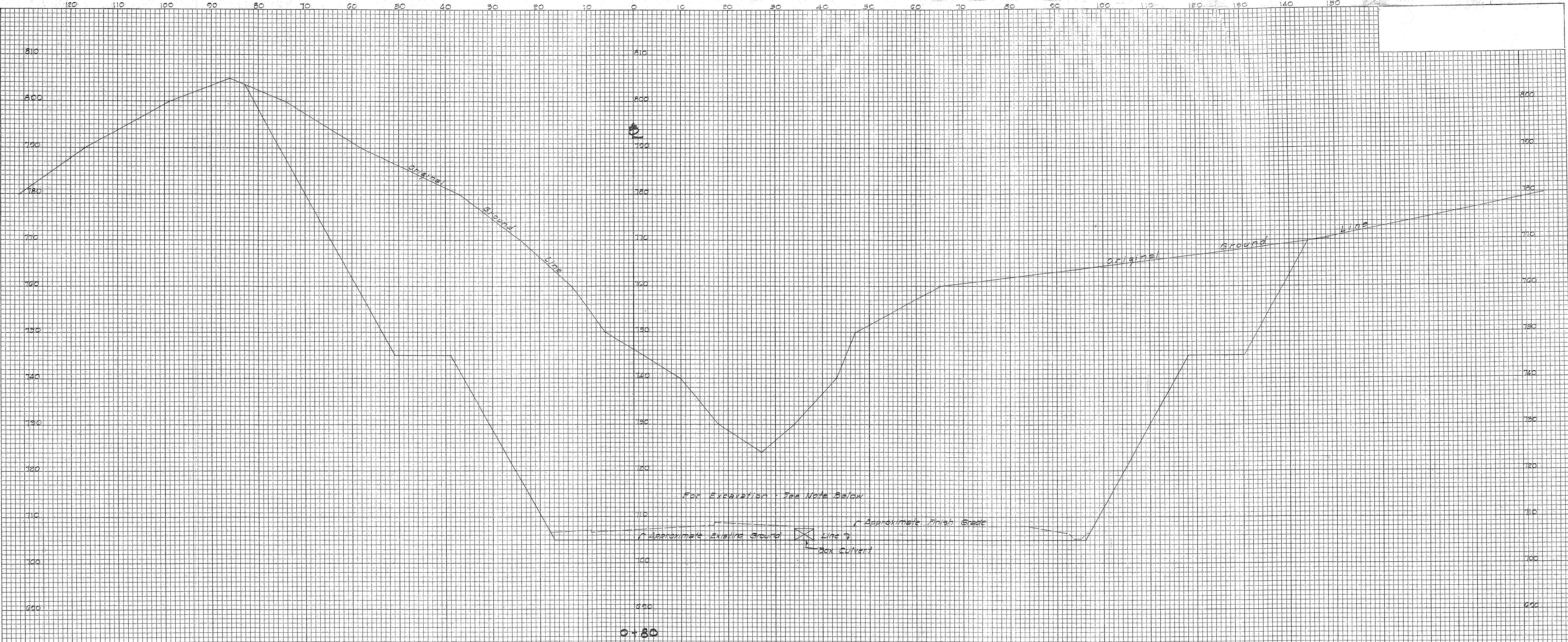
Sheet No. 39 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	2	2



FINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK NO. DATE BY

ORIGINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK NO. DATE BY



6 Roadway - Kalihī Sta 200+35.38 = Kaneohe Sta 0+80.00  
 This section is parallel with Kaneohe Portal Line.

NOTE: All excavation, rough grading, and embankment have already been done by others, and shall not be included in this Contract - Job No. 26-53.

Prior to commencement of work, elevations of the existing ground line shall be measured by the Engineer and the Contractor shall place fill material and base course to grade under the various items of work in accordance with the Plans and Specifications and as ordered by the Engineer.

This note shall apply to Dwg. No. R-31, R-32, R-33, R-34, & R-35, Sheet No. 40, 41, 42, 43, & 44.

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KANEOHE APPROACH ROAD  
 CROSS SECTIONS

ENGINEER: S.P.H. DATE: July 18, 1953  
 DRAFTSMAN: J.S. CHECKED BY: S.P.H. & R.P.  
 SCALE: Vert. 1"=10' Hor. 1"=10' TRACER: J.K.L.  
 APPROVED: *Le. J. J. ...* APPROVED: *J. M. ...*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*W. S. ...*  
 ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	C. S.
GR. SEC.	F. B.	S. S.
W. M. BY:	F. W. BY:	S. BY:

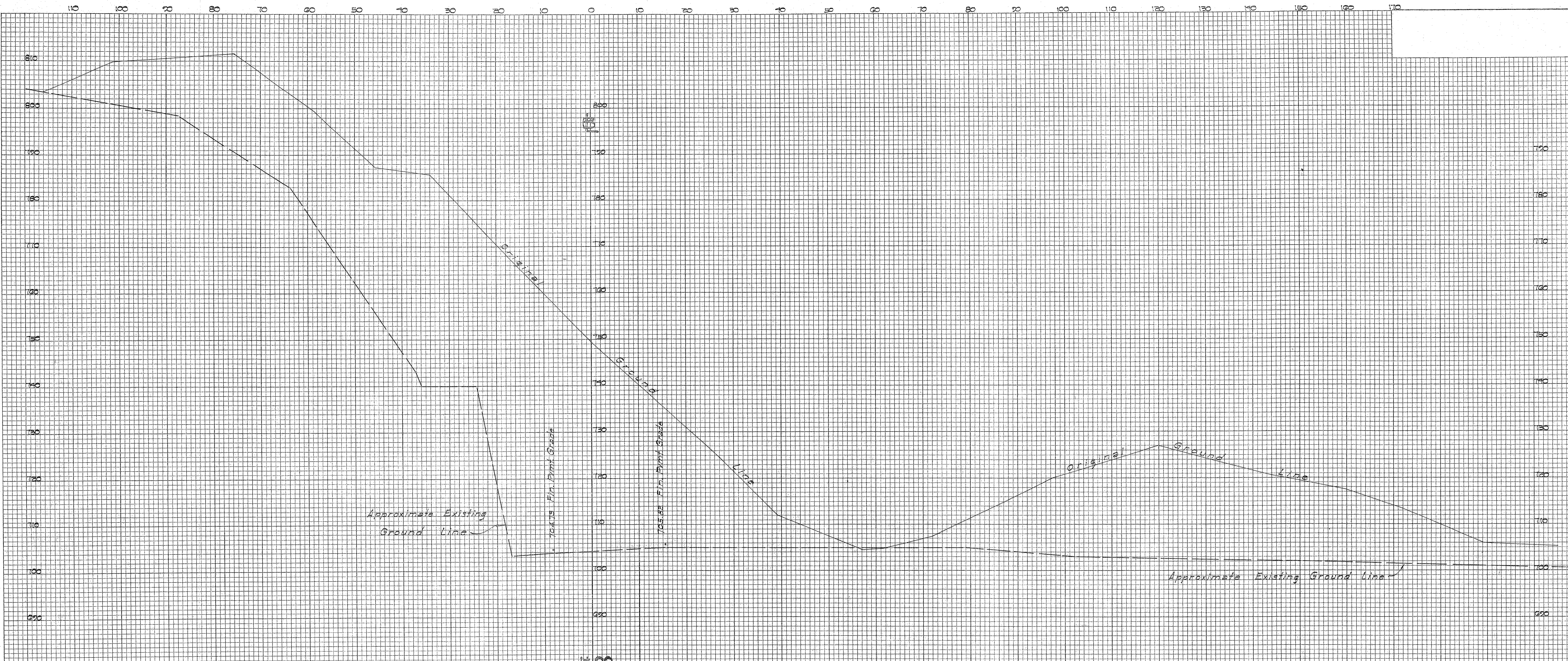
SECTION C JOB NO. 26-53 DWG. R-31

FILE	POCKET	FOLDER	NO.
7	5	2	3



FINAL SURVEY BY: DATE: SURVEYED PLOTTED TEMPLATE AREAS CHECKED: NO.

ORIGINAL SURVEY BY: DATE: SURVEYED PLOTTED TEMPLATE AREAS CHECKED: NO.



Note: For Excavation and Embankment - See Note on Dwg. No. R-31, Sheet No. 40.

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

### KALIHI TUNNEL KANEHOE APPROACH ROAD CROSS SECTIONS

ENGINEER: R.G.H. DATE: July 15, 1953  
DRAFTSMAN: J.S. CHECKED BY: S.M. R.M.  
SCALE: Vert. 1" = 10'; Hor. 1" = 10'  
APPROVED: *[Signature]* APPROVED: *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY:	F. W. BY:	S. BY:

APPROVED  
*[Signature]*  
ENGINEER, KALIHI TUNNEL

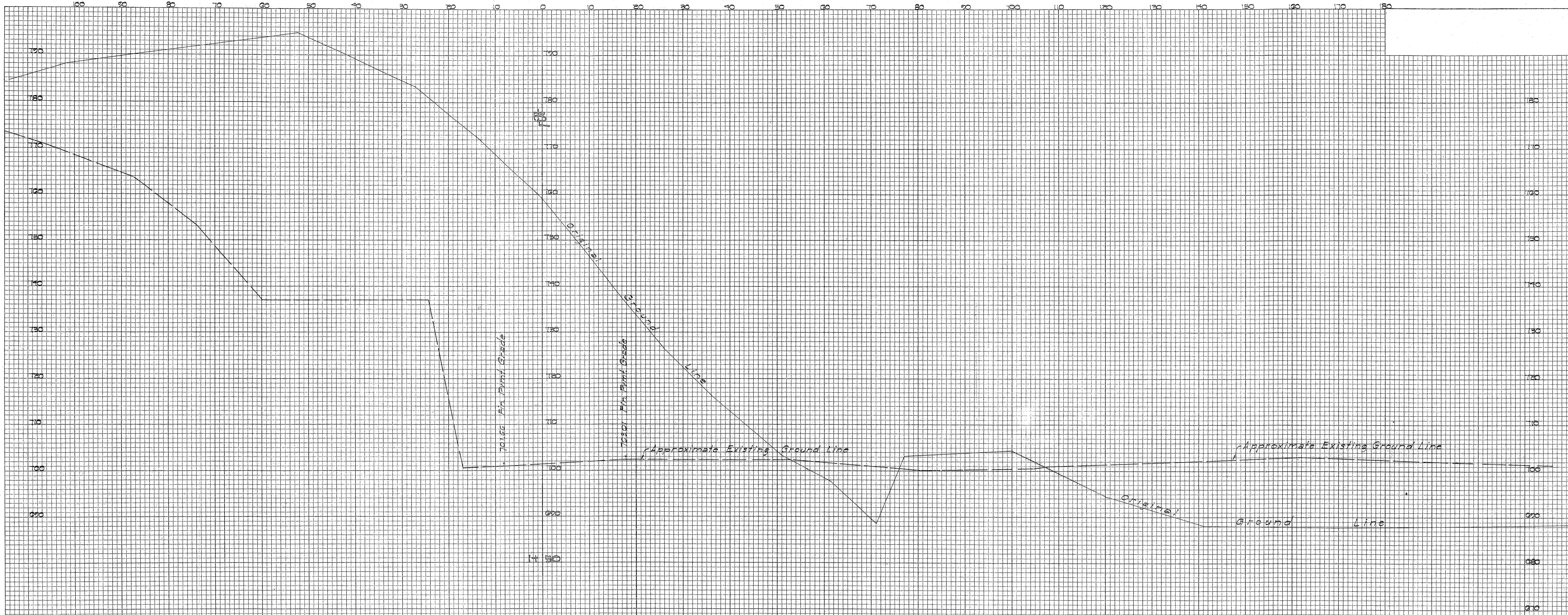
SECTION C JOB NO. 26-53 DWG. R-32

FILE	POCKET	FOLDER	NO.
7	5	2	4



FINAL SURVEYED BY DATE  
 SURVEY PLOTTED  
 NOTE BOOK TEMPLATE AREAS CHECKED  
 NO.

ORIGINAL SURVEYED BY DATE  
 SURVEY PLOTTED  
 NOTE BOOK TEMPLATE AREAS CHECKED  
 NO.



NOTE: For Excavation and Embankment - See Note on Dwg. No. R-31, Sheet No. 40

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 KANEOHE APPROACH ROAD  
 CROSS SECTIONS

ENGINEER *S.C.H.* DATE *JULY 15, 1953*  
 DRAFTSMAN *A.S.* CHECKED BY *S.C.H. - R.H.*  
 SOME *1/2" = 1' - 1/2" - 1/4" = 1' - 1/2"* TRACER *A.S.*  
 APPROVED *D. Jannotta* APPROVED *H.W. Bartz*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED *[Signature]*  
 ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY:	F. W. BY:	S. BY:

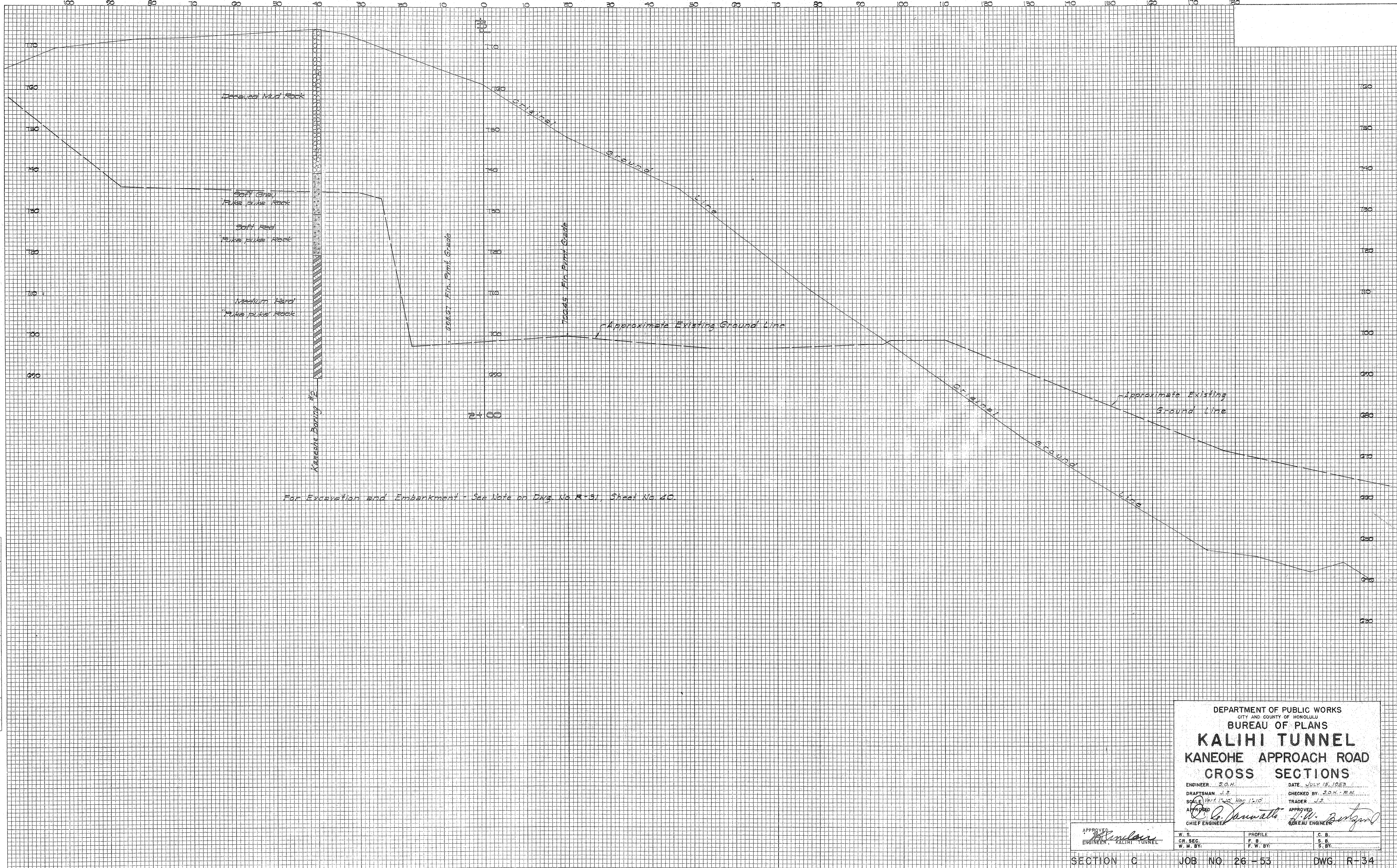
SECTION C JOB NO. 26-53 DWG. R-33

FILE	POCKET	FOLDER	NO.
7	5	2	9



FINAL SURVEY SURVEYED, PLOTTED, TEMPLATE AREAS CHECKED. NO. BY DATE

ORIGINAL SURVEY SURVEYED, PLOTTED, TEMPLATE AREAS CHECKED. NO. BY DATE



APPROVED  
ENGINEER, KALIHI TUNNEL

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
Kaneohe Approach Road  
CROSS SECTIONS

ENGINEER: S.O.H. DATE: July 15, 1963  
DRAFTSMAN: J.S. CHECKED BY: S.O.H. - R.M.  
SCALE: Vert. 1" = 10'. Hor. 1" = 10'. TRACER: J.S.  
APPROVED: C. J. ... APPROVED: H.W. ...  
CHIEF ENGINEER BUREAU ENGINEER

W.S. PROFILE C.B.  
D.R. SEC. F.S. S.B.  
W.M. BY: F.W. BY: S.B.

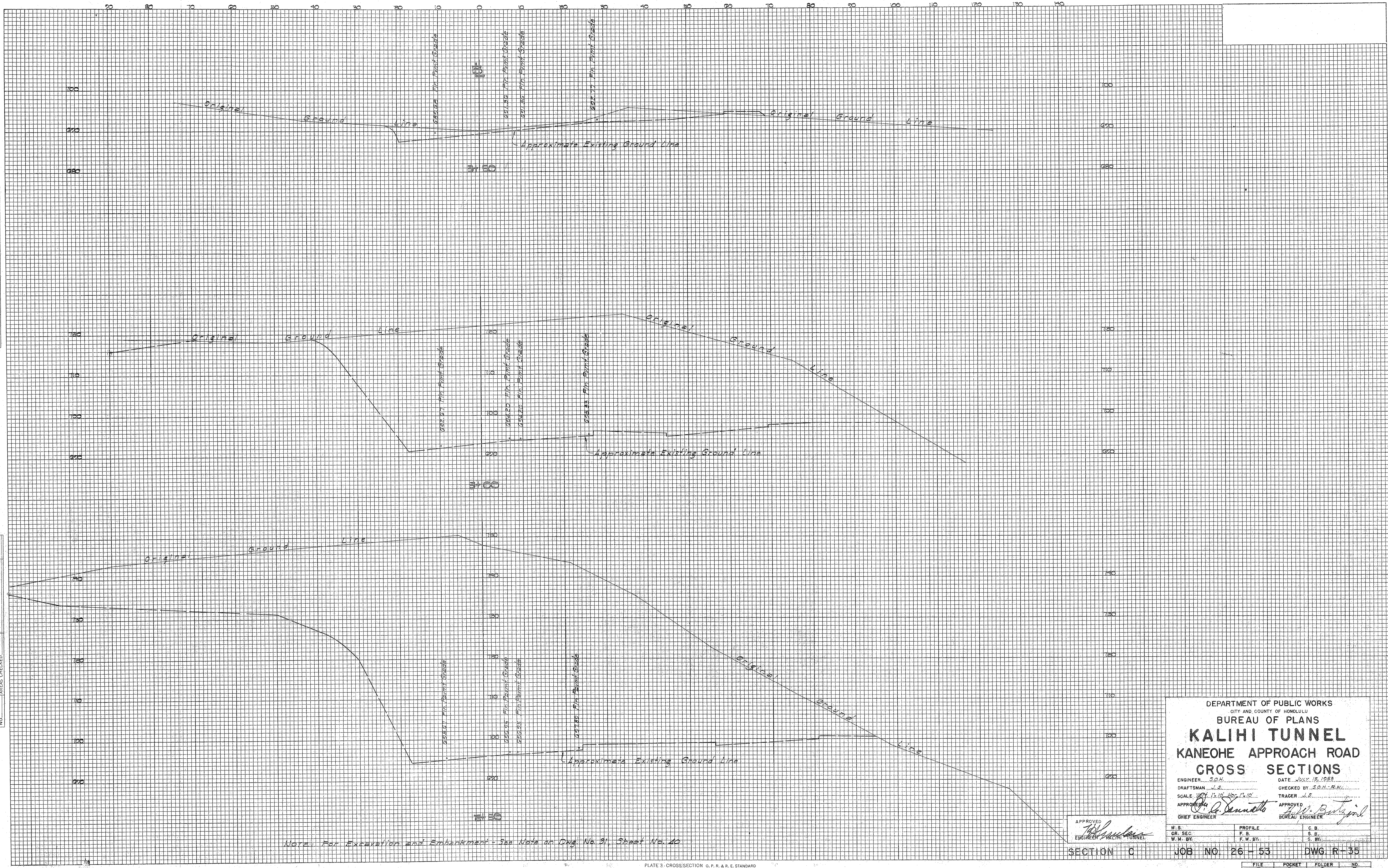
SECTION C JOB NO. 26-53 DWG. R-34

FILE	POCKET	FOLDER	NO.
7	5	2	6



FINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK NO. DATE, AREAS CHECKED.

ORIGINAL SURVEY SURVEYED, PLOTTED, NOTE BOOK NO. DATE, AREAS CHECKED.



Note: For Excavation and Embankment - See Note on Dwg. No. 31, Sheet No. 40

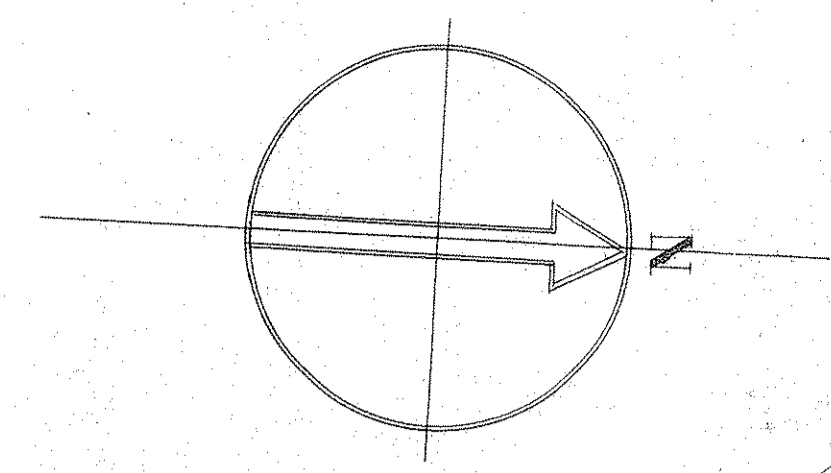
DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
KANEHOE APPROACH ROAD  
CROSS SECTIONS

ENGINEER: S.D.H. DATE: July 15, 1953  
DRAFTSMAN: M.S. CHECKED BY: S.D.H./S.B.K.  
SCALE: 1" = 10' HORIZ. 1" = 10' VERT.  
APPROVED: [Signature] APPROVED: [Signature]  
CHIEF ENGINEER BUREAU ENGINEER

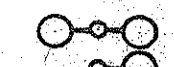
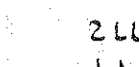
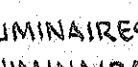
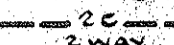
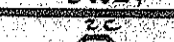


W.S.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S. BY

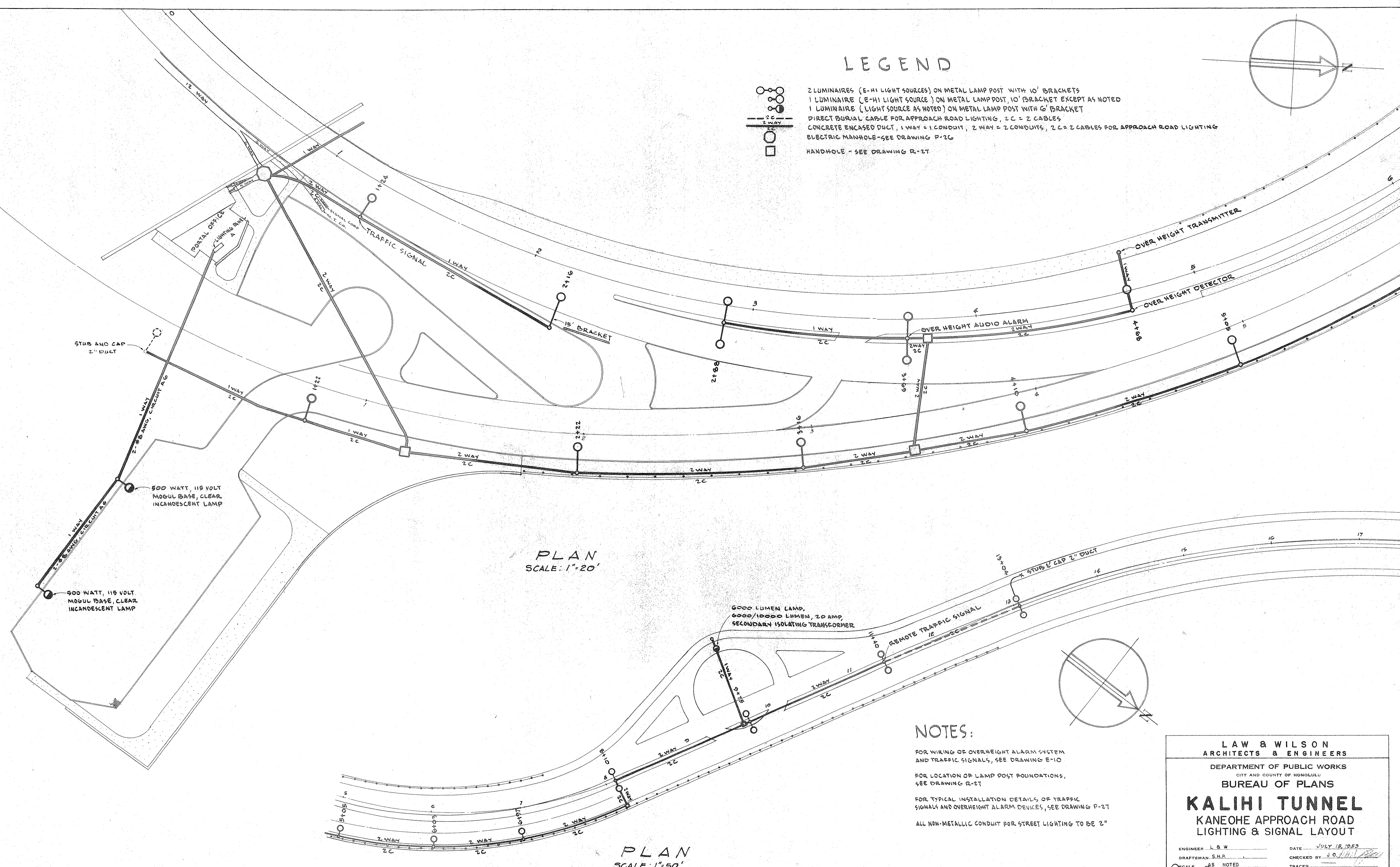
SECTION C JOB NO. 26-53 DWG. R-35





### LEGEND

-  2 LUMINAIRES (E-HI LIGHT SOURCES) ON METAL LAMP POST WITH 10' BRACKETS
-  1 LUMINAIRE (E-HI LIGHT SOURCE) ON METAL LAMP POST, 10' BRACKET EXCEPT AS NOTED
-  1 LUMINAIRE (LIGHT SOURCE AS NOTED) ON METAL LAMP POST WITH 6' BRACKET
-  DIRECT BURIAL CABLE FOR APPROACH ROAD LIGHTING, 2 C = 2 CABLES
-  CONCRETE ENCASED DUCT, 1 WAY = 1 CONDUIT, 2 WAY = 2 CONDUITS, 2 C = 2 CABLES FOR APPROACH ROAD LIGHTING
-  ELECTRIC MANHOLE - SEE DRAWING P-26
-  HANDHOLE - SEE DRAWING R-27

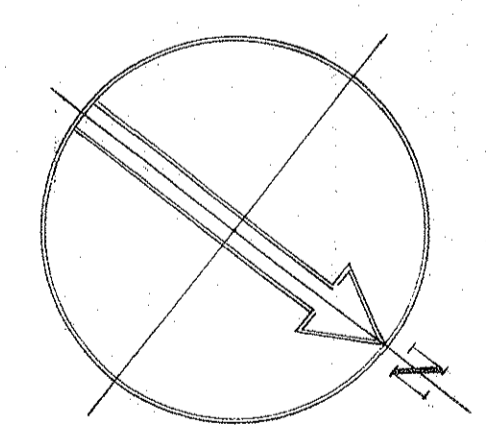


PLAN  
SCALE: 1"=20'

PLAN  
SCALE: 1"=50'

### NOTES:

- FOR WIRING OF OVERHEIGHT ALARM SYSTEM AND TRAFFIC SIGNALS, SEE DRAWING E-10
- FOR LOCATION OF LAMP POST FOUNDATIONS, SEE DRAWING R-27
- FOR TYPICAL INSTALLATION DETAILS OF TRAFFIC SIGNALS AND OVERHEIGHT ALARM DEVICES, SEE DRAWING P-27
- ALL NON-METALLIC CONDUIT FOR STREET LIGHTING TO BE 2"



**LAW & WILSON**  
ARCHITECTS & ENGINEERS

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

## KALIHI TUNNEL

### KANEOHE APPROACH ROAD LIGHTING & SIGNAL LAYOUT

ENGINEER: L. B. W.	DATE: JULY 15, 1953
DRAFTSMAN: S.H.P.	CHECKED BY: J.O. [Signature]
SCALE: AS NOTED	TRACER:
APPROVED: [Signature]	APPROVED: [Signature]
CHIEF ENGINEER	BUREAU ENGINEER

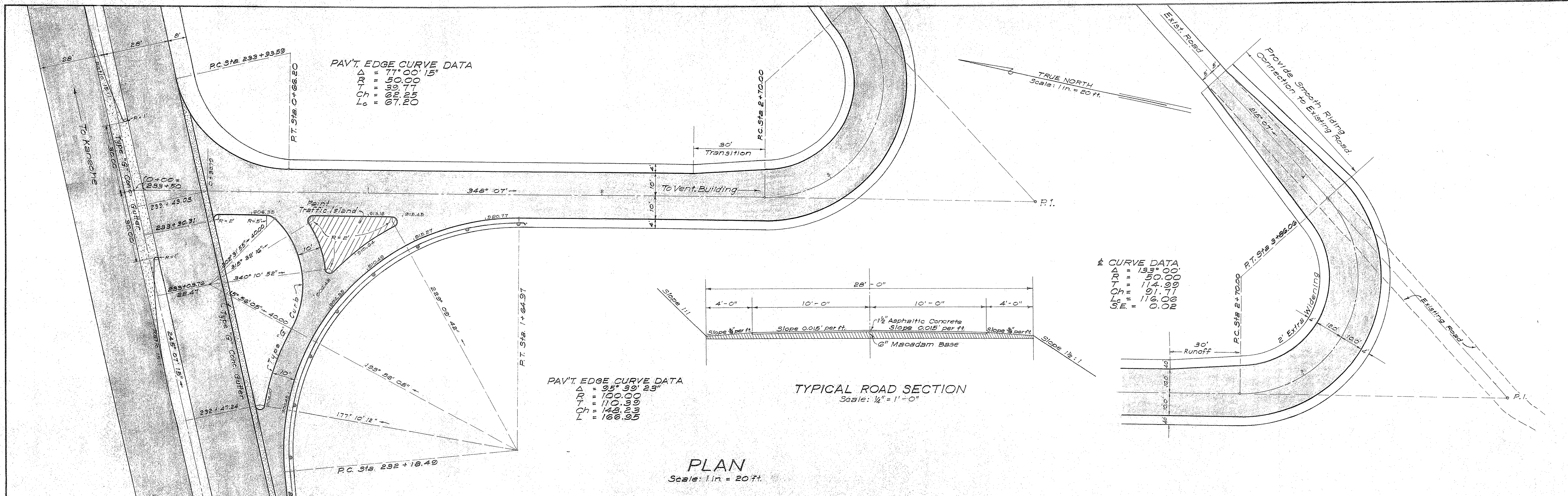
W.S.	PROFILE	C.B.
CR. SEC.	P.B.	S.B.
W.M.B.Y.	P.W.B.Y.	S.B.Y.

SECTION C      JOB NO. 26-53      DWG. R-36



DATE	
BY	
REVISIONS	
NO.	
DATE	
BY	
REVISIONS	
NO.	
DATE	
BY	
REVISIONS	
NO.	
DATE	
BY	
REVISIONS	
NO.	
DATE	
BY	
REVISIONS	
NO.	

DATE	
BY	
REVISIONS	
NO.	
DATE	
BY	
REVISIONS	
NO.	
DATE	
BY	
REVISIONS	
NO.	
DATE	
BY	
REVISIONS	
NO.	



DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHU TUNNEL**  
VENTILATION BUILDING ACCESS RD.  
PART - I  
PLAN & PROFILE

ENGINEER: R. K. G. I. DATE: JULY 15, 1958  
DRAFTSMAN: B. J. CHECKED BY: S. C. H. S. M.  
SCALE: AS SHOWN TRACER: G. I.  
APPROVED: *[Signature]* APPROVED: *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY	F. W. BY	S. BY

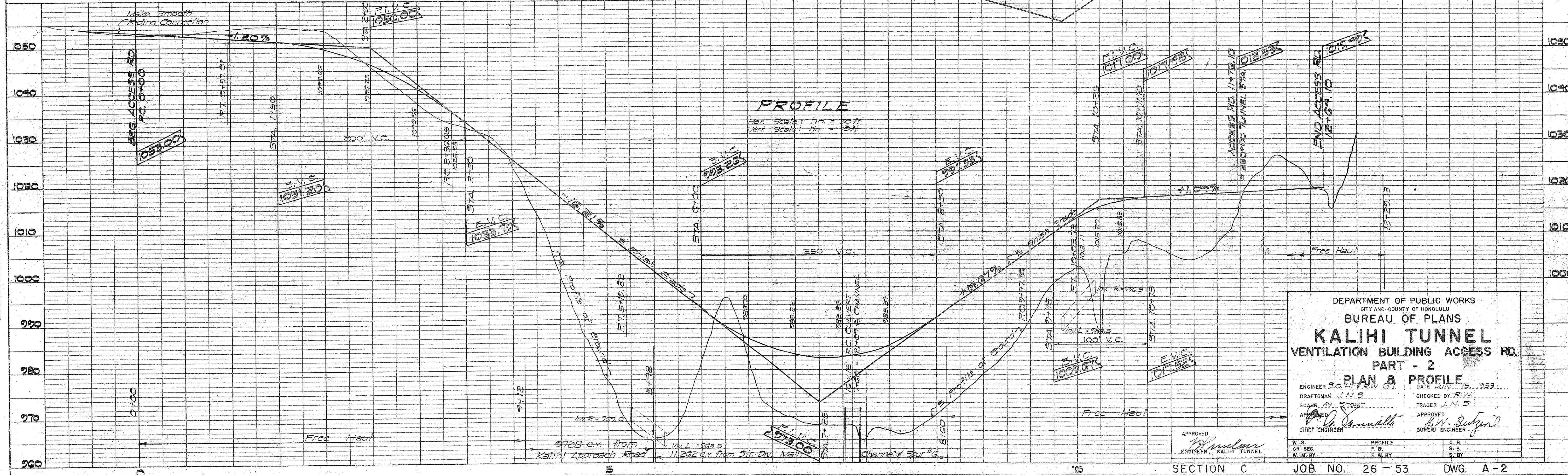
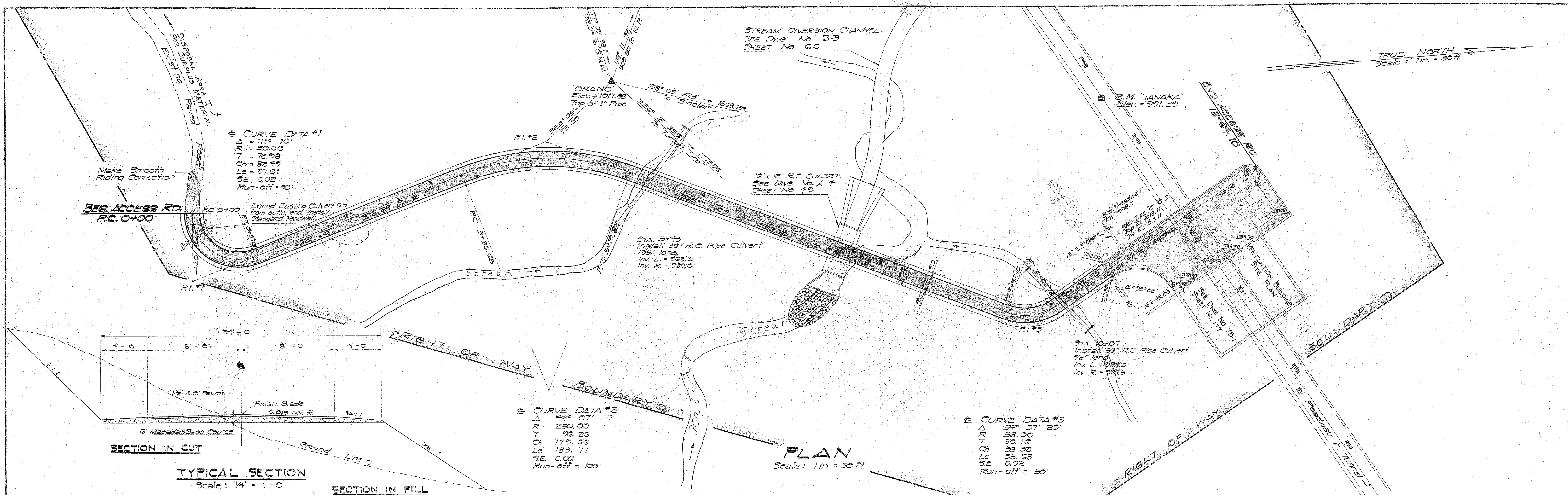
SECTION C JOB NO. 26-53 DWG. A-1



DATE	BY

DATE	BY

DATE	BY



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

# KALIHI TUNNEL

## VENTILATION BUILDING ACCESS RD.

### PART - 2

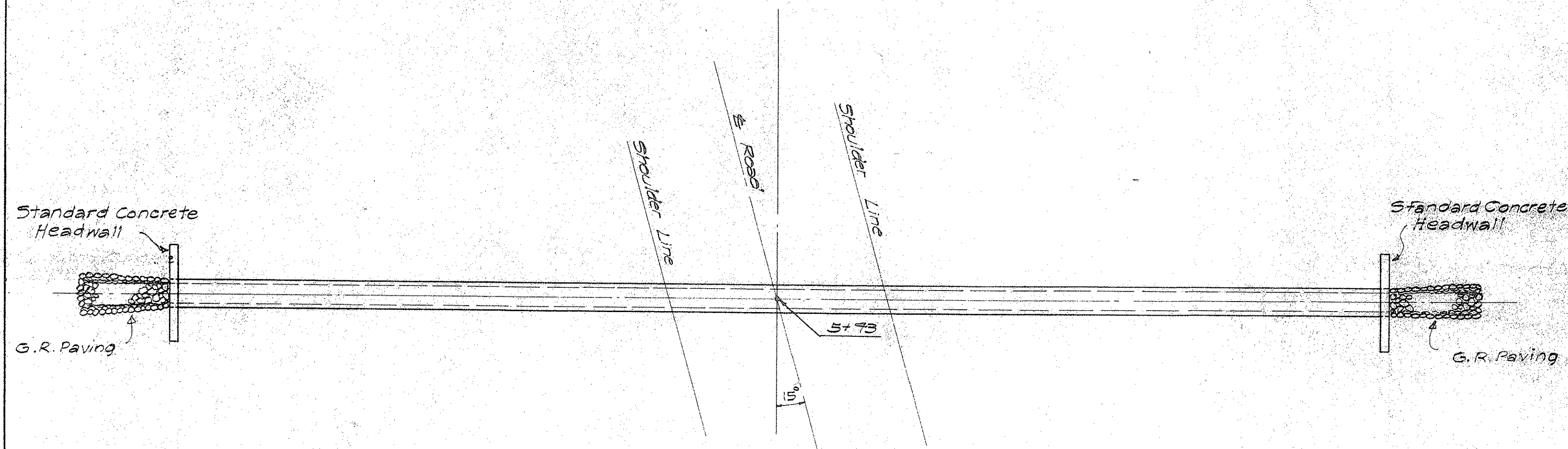
#### PLAN & PROFILE

ENGINEER *[Signature]* DATE JULY 15, 1953  
DRAFTSMAN J.N.S. CHECKED BY R.W.  
SCALE AS SHOWN TRACER J.N.S.  
APPROVED *[Signature]* APPROVED *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

W.S.	PROFILE	G.B.
GR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S.T.

SECTION C JOB NO. 26-53 DWG. A-2

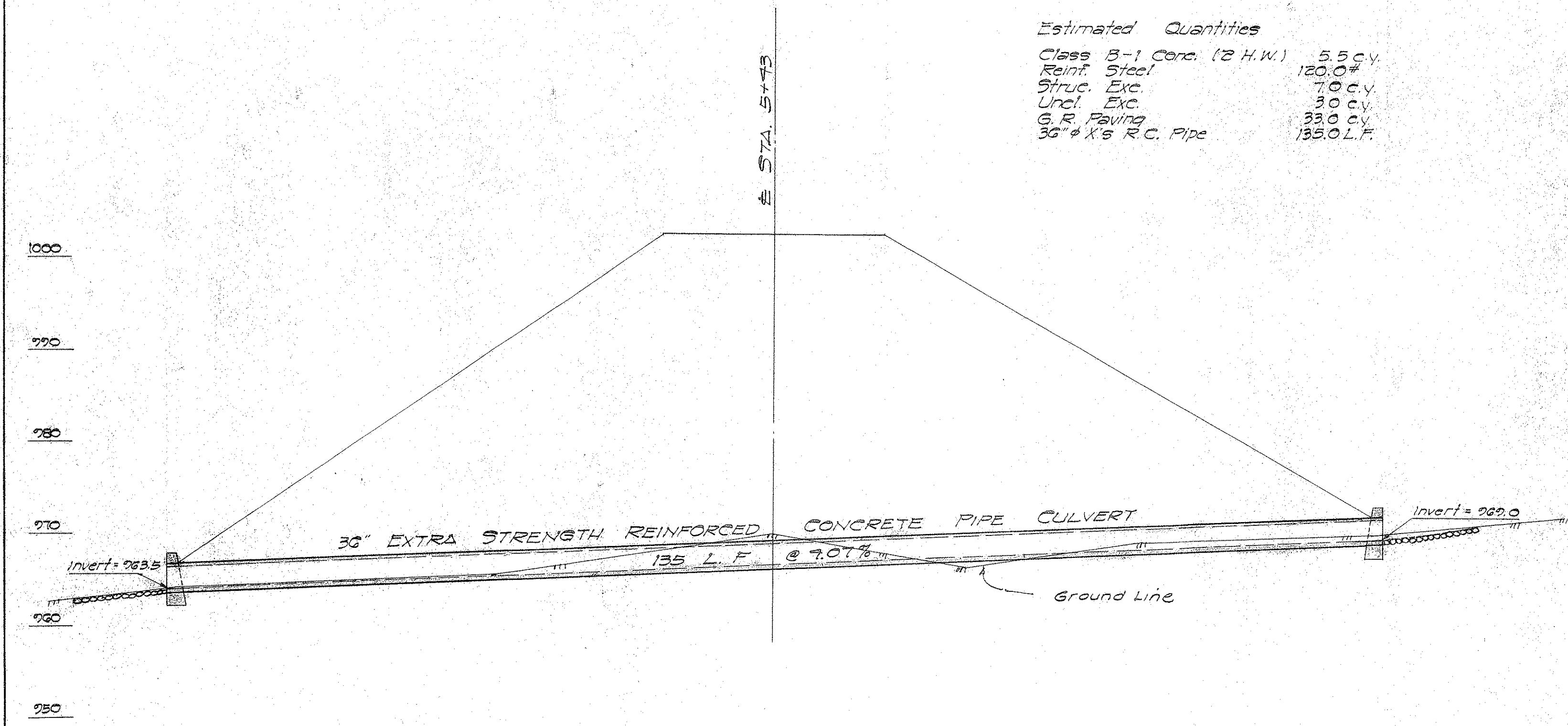




**PLAN**  
Scale: 1" = 10'

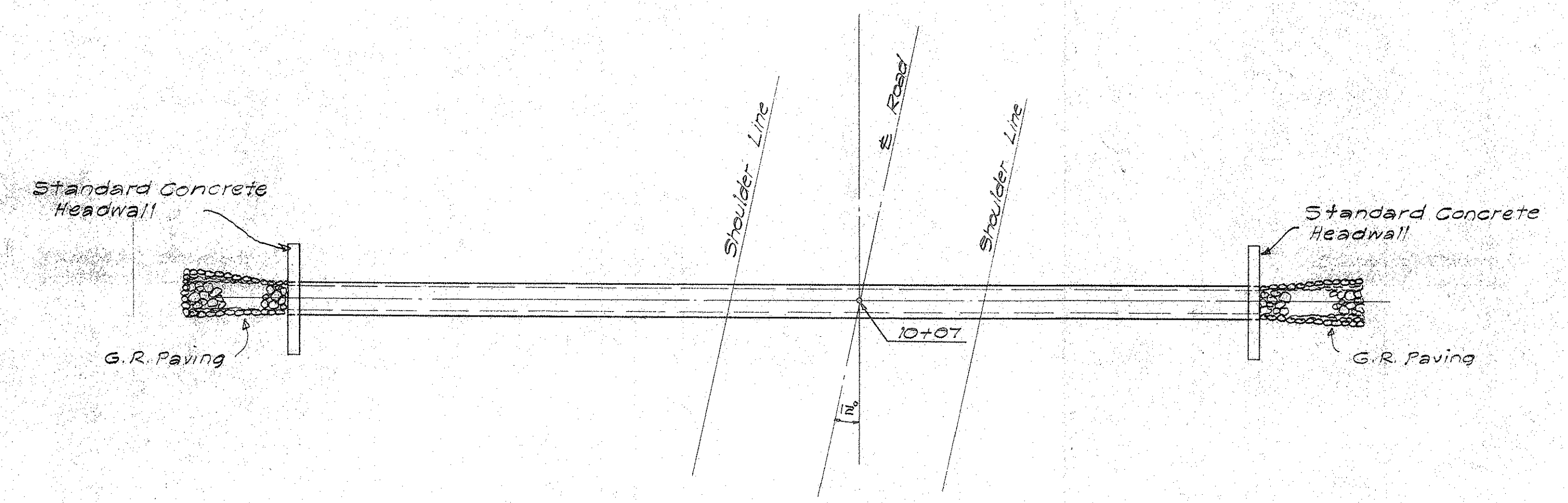
Estimated Quantities

Class B-1 Conc. (2 H.W.)	5.5 CY
Reinf. Steel	120.0 L.F.
Struc. Exc.	7.0 CY
Uncl. Exc.	3.0 CY
G.R. Paving	33.0 CY
36" x 6' R.C. Pipe	135.0 L.F.



**SECTION**  
Scale: 1" = 10'

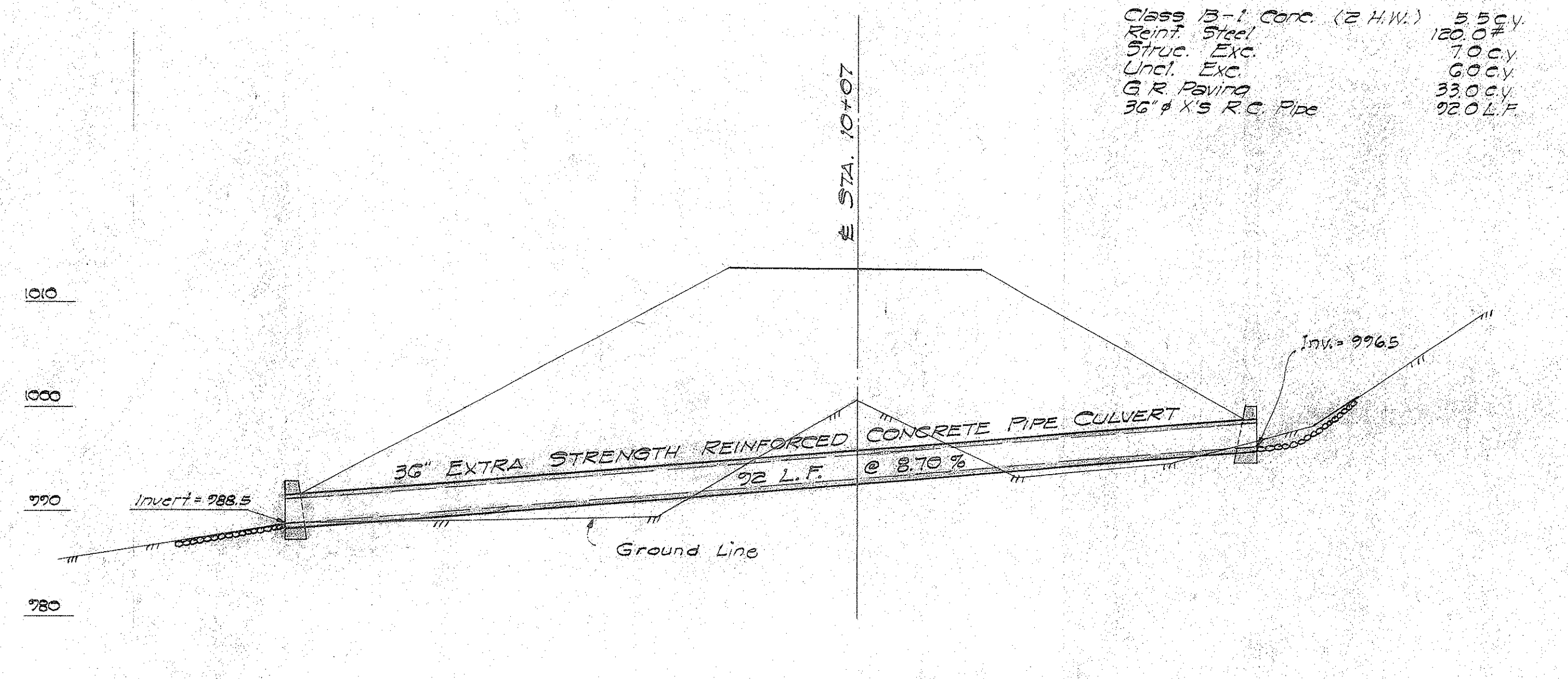
**36" R.C. CULVERT AT & STA. 5+93**



**PLAN**  
Scale: 1" = 10'

Estimated Quantities

Class B-1 Conc. (2 H.W.)	5.5 CY
Reinf. Steel	120.0 L.F.
Struc. Exc.	7.0 CY
Uncl. Exc.	3.0 CY
G.R. Paving	33.0 CY
36" x 6' R.C. Pipe	92.0 L.F.



**SECTION**  
Scale: 1" = 10'

**36" R.C. CULVERT AT & STA. 10+07**

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

**KALIHI TUNNEL**  
VENTILATION BUILDING ACCESS RD.  
PART - 2  
CULVERTS

ENGINEER: S.O.H. - R.W. DATE: JULY 12, 1952  
DRAFTSMAN: G.L. CHECKED BY: S.O.H. - R.W.  
SCALE: 1" = 10' TRACER: J.S.  
APPROVED: *G. L. Yamamoto* APPROVED: *H. N. Butz*  
CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*[Signature]*  
ENGINEER, KALIHI TUNNEL

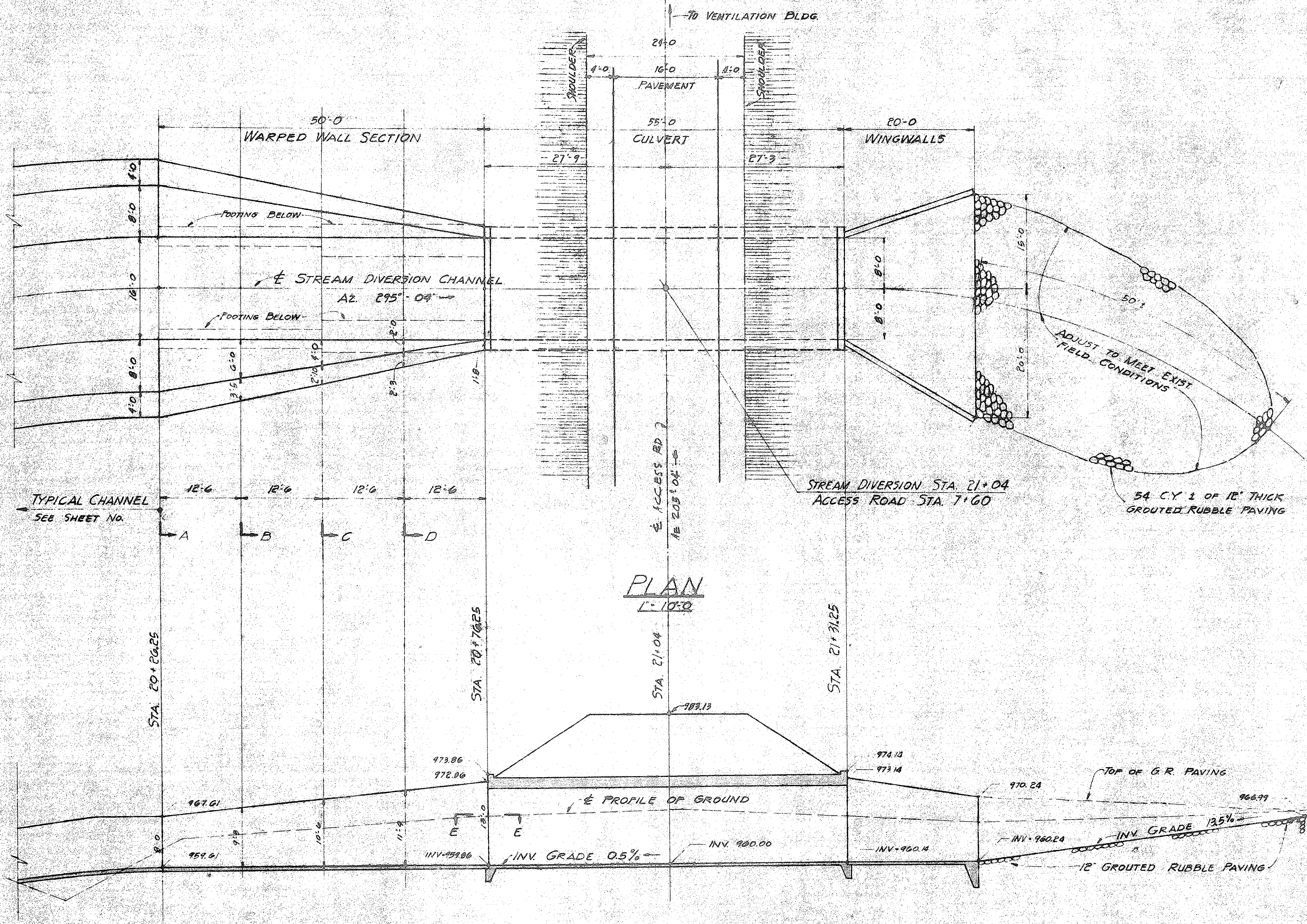
W. S.	PROFILE	C. S.
CH. SEC.	F. S.	S. S.
W. M. BY:	F. W. BY:	S. BY:

SECTION C JOB NO. 26 - 53 DWG. A - 3

Sheet No. 48 of 252 Sheets

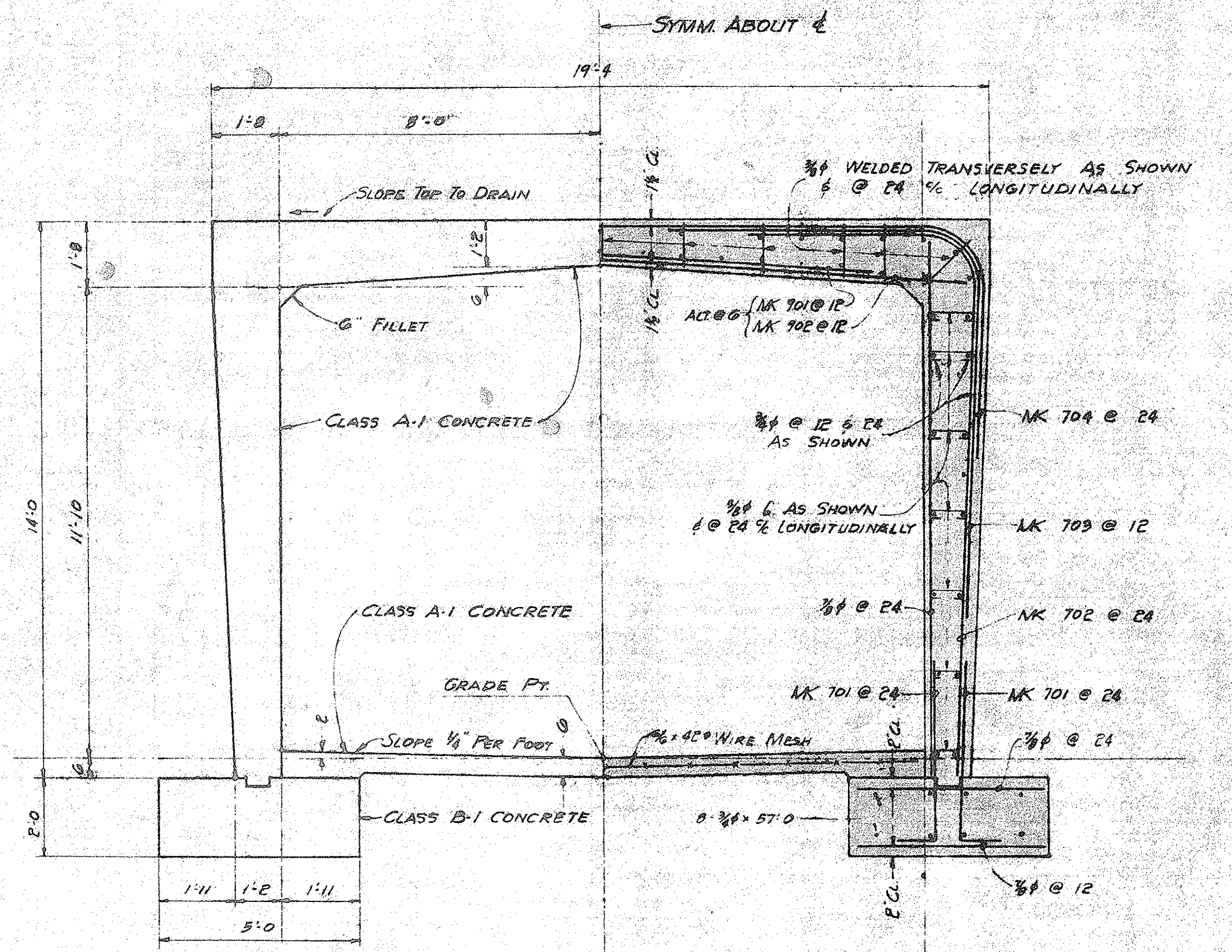
FILE	FOCKET	FOLDER	NO.
7	5	2	11





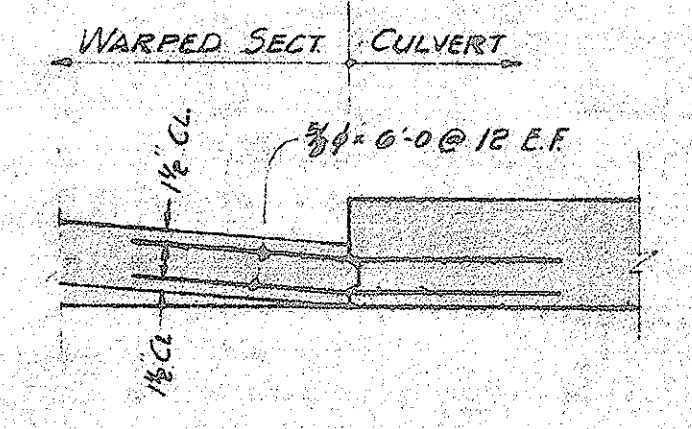
PLAN  
1" = 10'-0"

LONGITUDINAL SECTION  
SCALE: 1" = 10'-0"

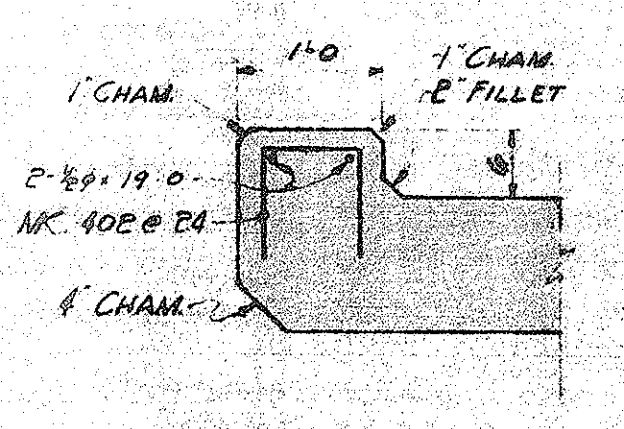


TYPICAL CULVERT SECTION  
3/8" = 1'-0"

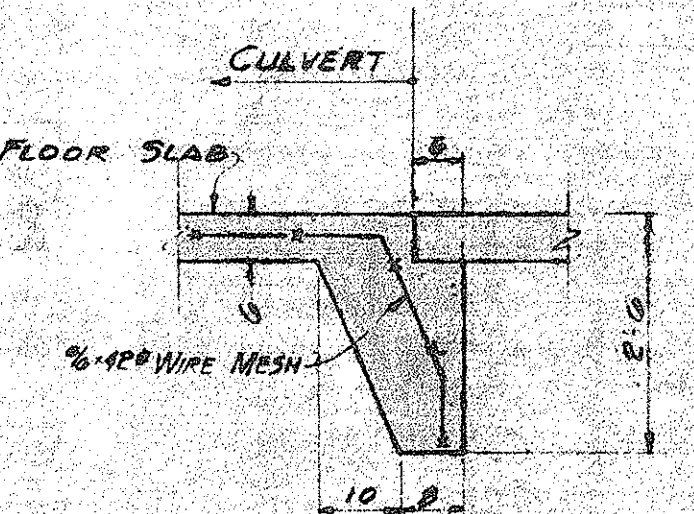
NOTE: ALL SPLICES TO BE STAGGERED AND LAPPED WITH A MINIMUM OF 40 BAR DIAMETERS.



SECTION E-E  
3/8" = 1'-0"



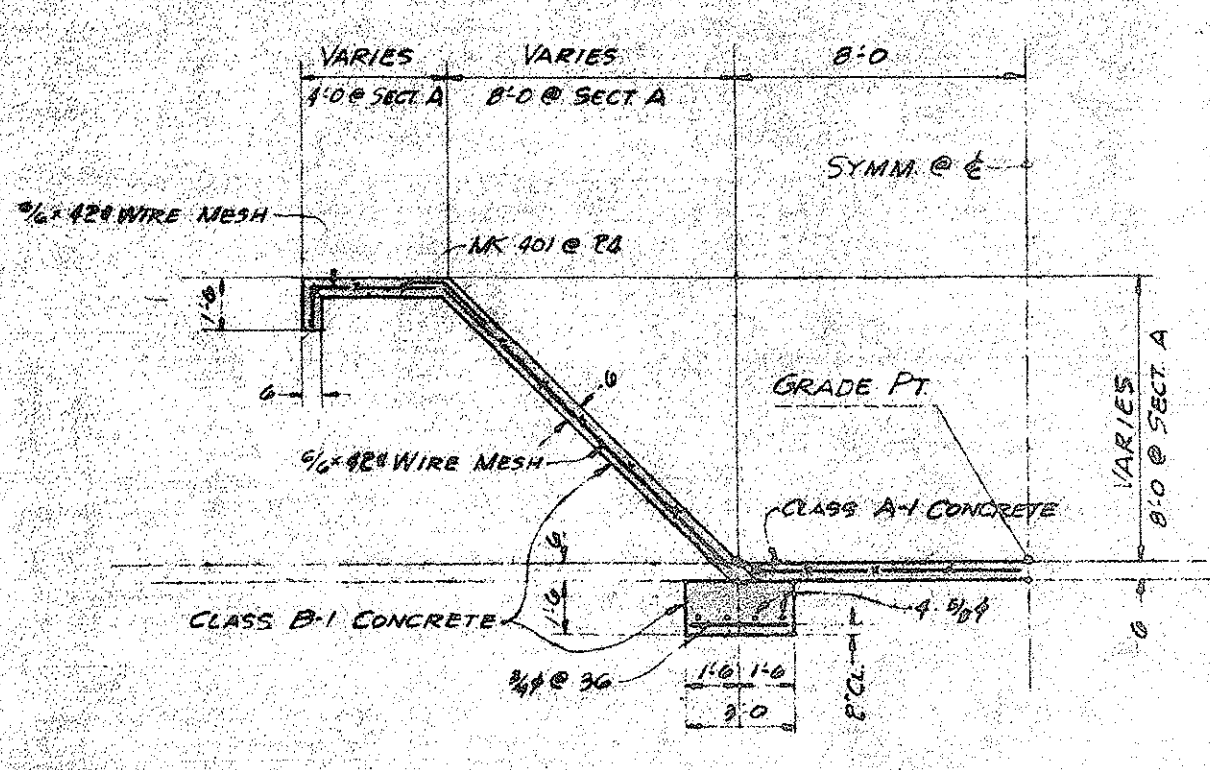
HEADWALL DETAIL  
3/8" = 1'-0"



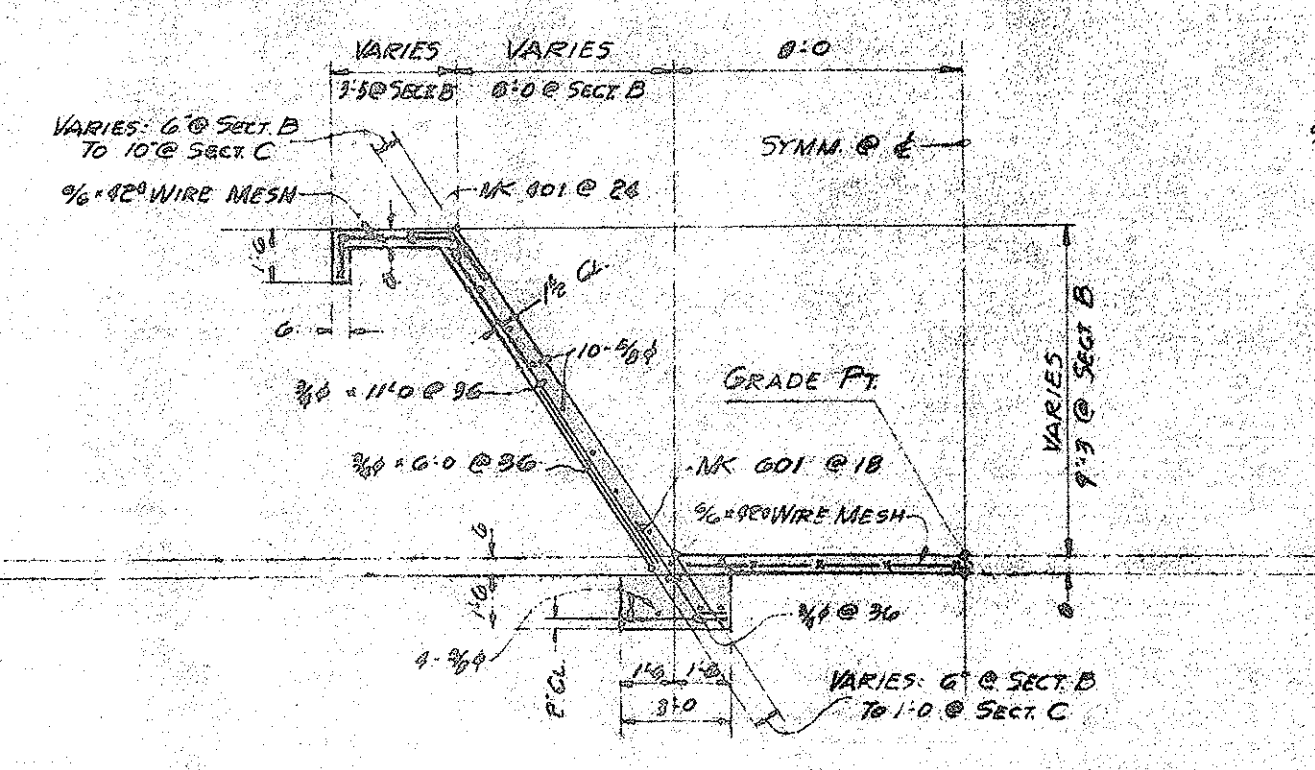
CUT-OFF WALL DETAIL  
3/8" = 1'-0"

CULVERT DETAILS

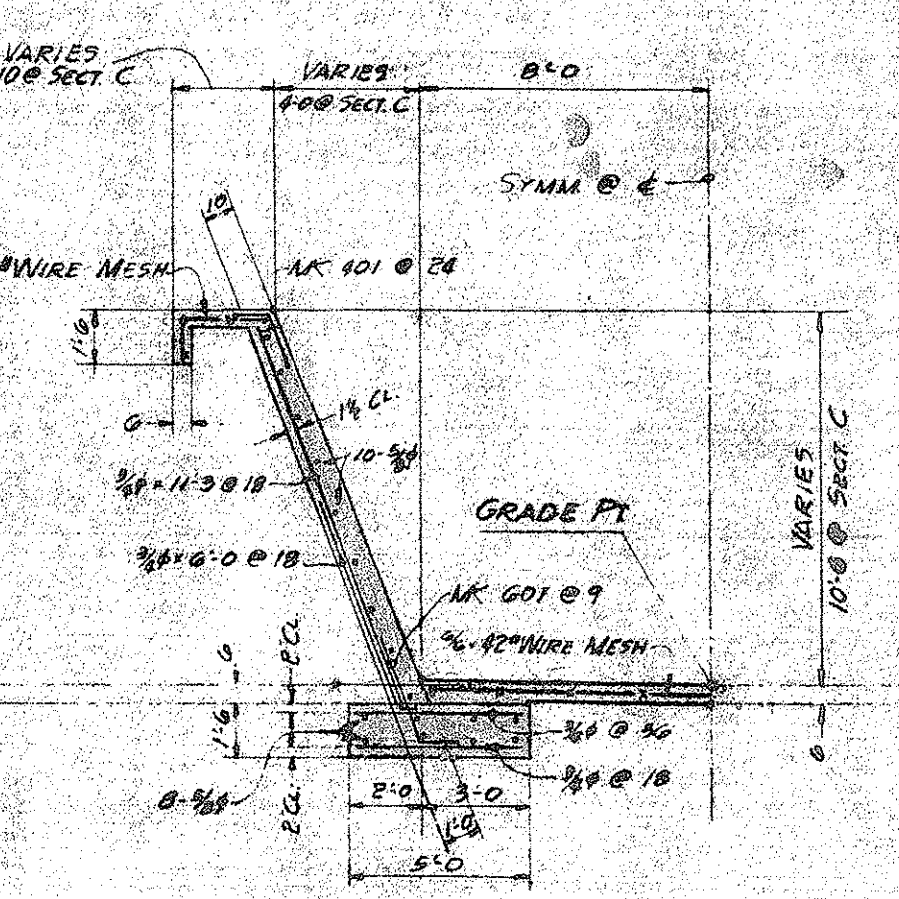
NOTE: WORK THIS SHEET WITH DRAWING A-5



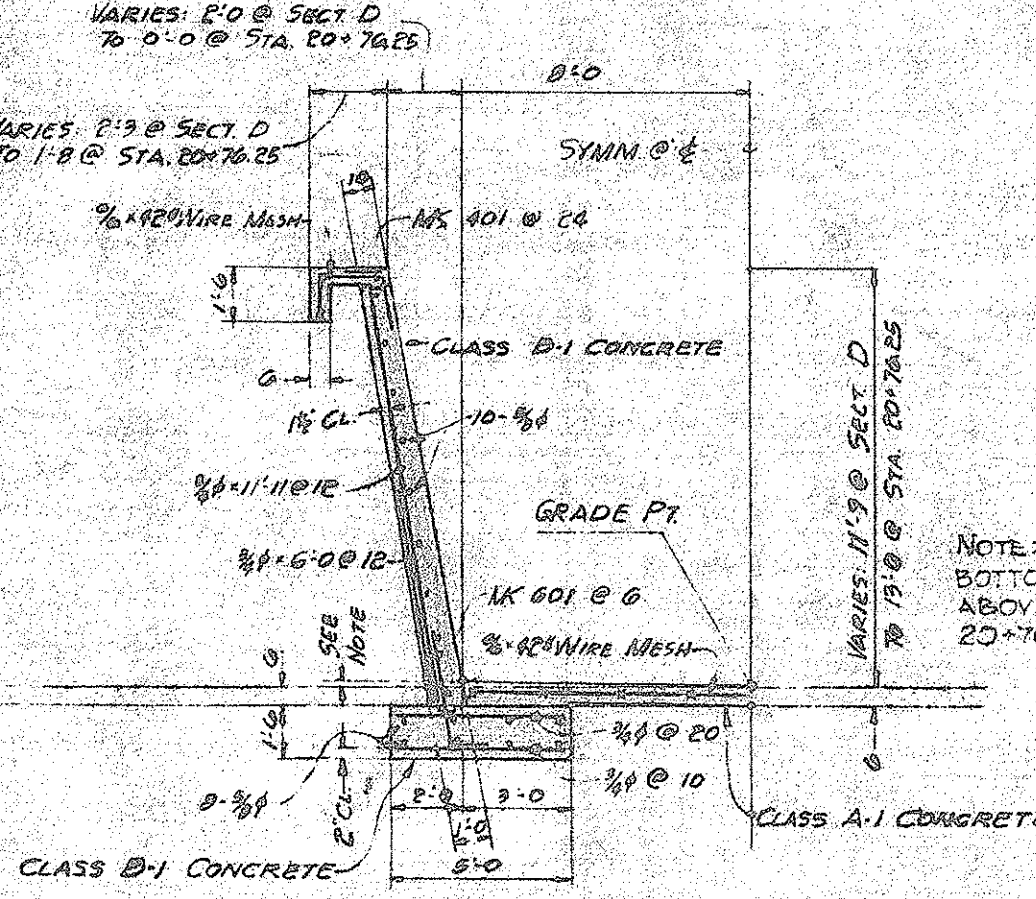
SECTION A



SECTION B



SECTION C



SECTION D

DETAILS OF WARPED WALL SECTION  
3/16" = 1'-0"

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

## KALIHI TUNNEL

VENT. BLD'G ACCESS ROAD PART II  
CULVERT DETAILS - STA. 7+60

ENGINEER: W. LUM & E. W. DATE: JULY 15, 1963  
DRAFTSMAN: E. WATANABE CHECKED BY: W. TOKUSHIGE  
SCALE: AS NOTED TRACER: E. W.  
APPROVED: [Signature] APPROVED: [Signature]  
CHIEF ENGINEER BUREAU ENGINEER

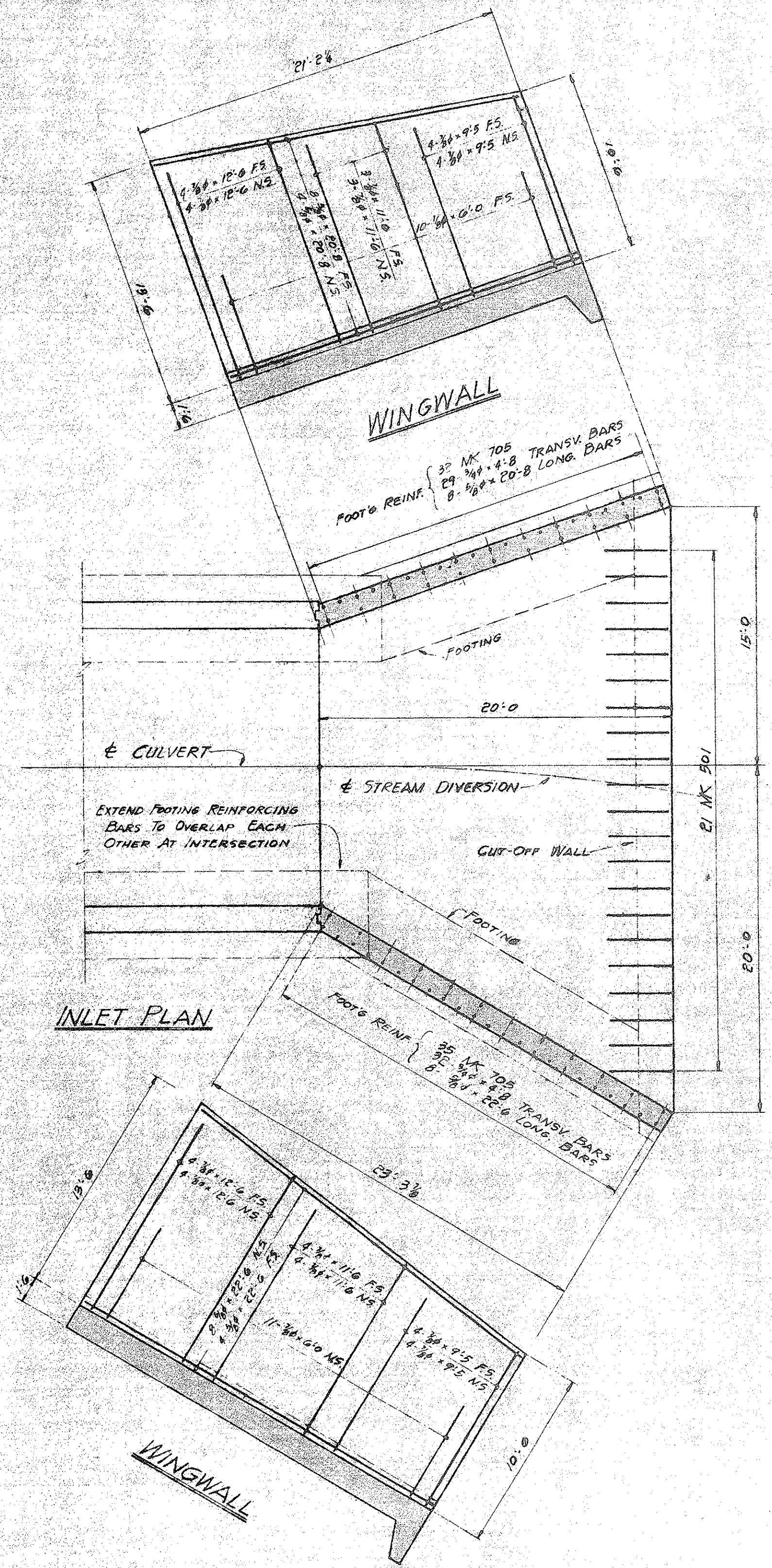
APPROVED  
ENGINEER, KALIHI TUNNEL

W.S.	PROFILE	C.D.
C.B. SEC.	P.B.	S.B.
W.H. BY:	F.W. BY:	S. BY:

SECTION C JOB NO. 26-53 DWG. A-4

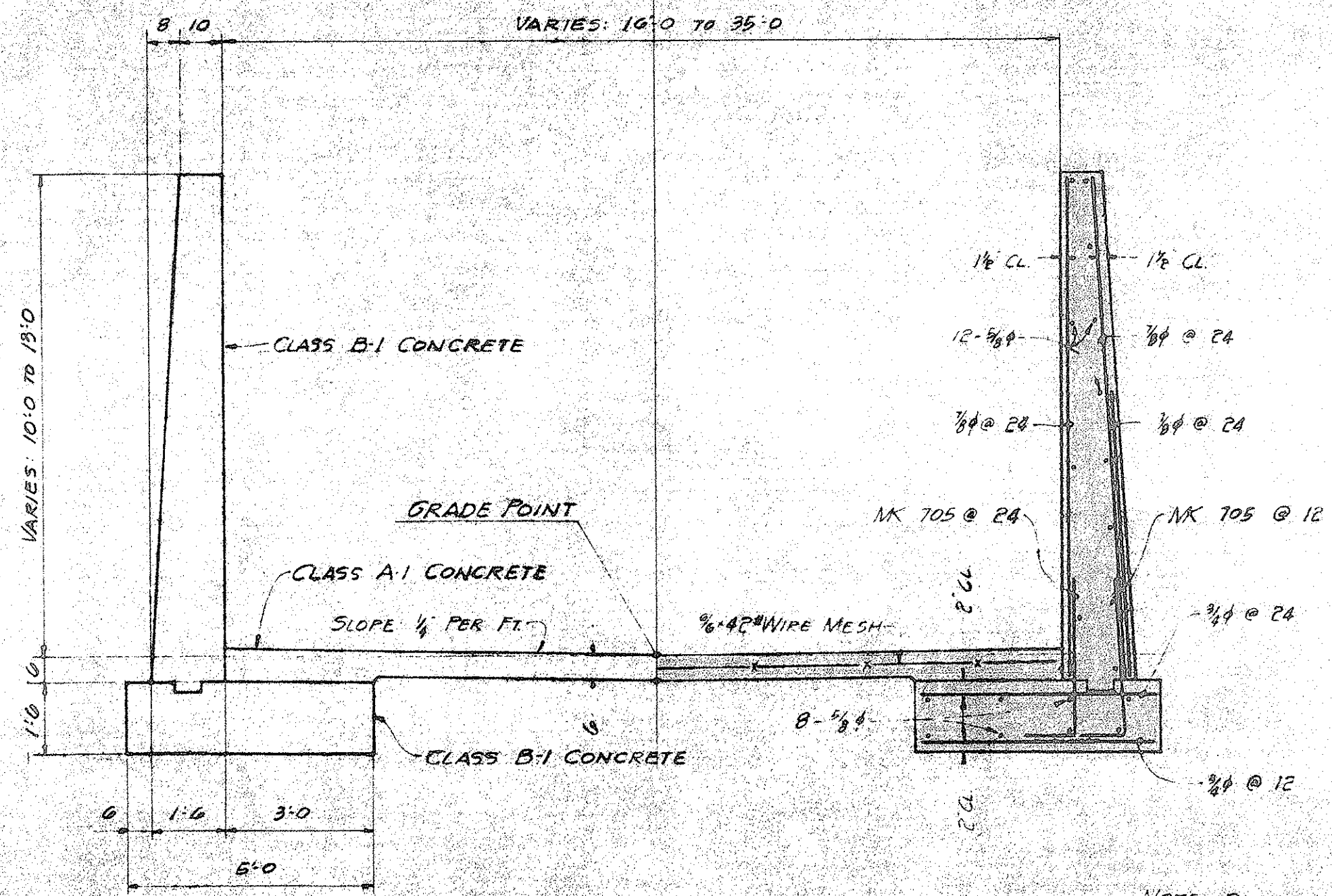
FILE	PROJECT	NUMBER	NO.
7	5	2	12



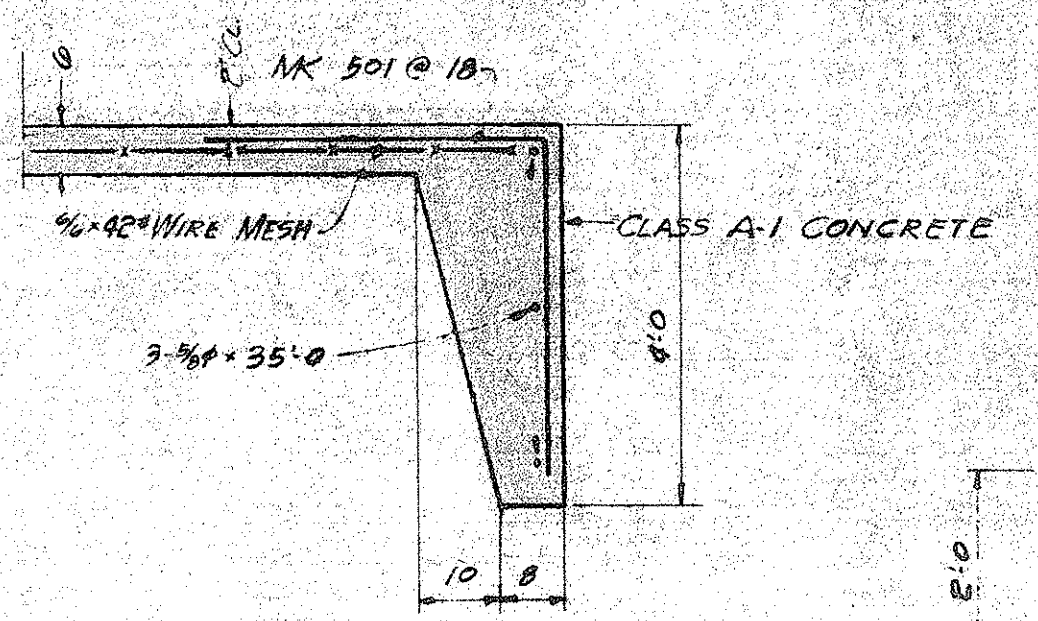


WINGWALL REINFORCING 1/2" = 1'-0"

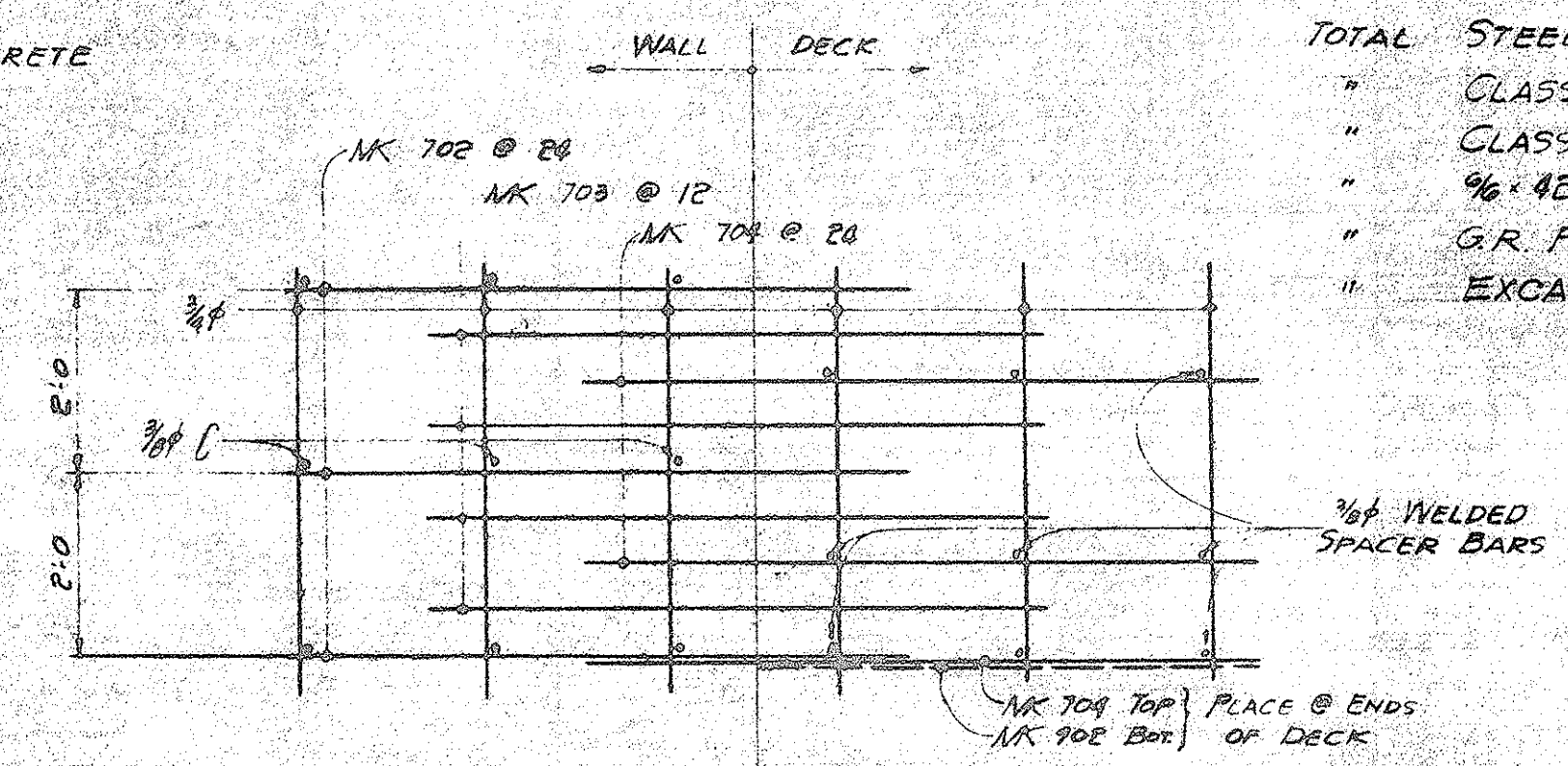
INLET & WINGWALL DETAILS



TYPICAL WINGWALL SECTION  
1/2" = 1'-0"



SECTION F 1/2" = 1'-0"



REINFORCING SCHEME  
TOP STEEL OF CULVERT DECK

LIST OF MATERIALS													
BENDING DIAGRAMS ALL DIMENSIONS OUT TO OUT	MARK	NO. REQ'D	SIZE	LENGTH	REMARKS	LBS. ST'L	CY. CONC.	CLASS CONC.					
	701	116	1/2"	5'-3"	FOOTING				B-1				
	174	1/2"	4'-8"										
	10	1/2"	57'-0"										
	702	58	1/2"	19'-1"									
	703	110	1/2"	17'-1"	WALLS CULVERT				A-1				
	704	29	1/2"	29'-7"									
	58	1/2"	13'-9"										
	50	1/2"	6'-0"										
	32	1/2"	54'-8"										
	406	3/8"	VARIES										
	901	55	1"	13'-6"									
	902	56	1"	18'-10"									
	34	3/4"	54'-8"										
	319	3/8"	VARIES										
	702	22	1/2"	2'-3"	FLOOR SLAB				A-1				
	4	1/2"	19'-0"										
	705	67	1/2"	4'-0"									
	67	1/2"	4'-8"										
	8	1/2"	20'-8"										
	8	1/2"	22'-0"										
	10	1/2"	12'-6"										
	14	1/2"	11'-6"										
	10	1/2"	9'-5"										
	21	1/2"	6'-0"										
	12	1/2"	20'-8"	WINGWALLS				B-1					
	12	1/2"	22'-0"										
	501	21	1/2"						7'-0"				
	3	1/2"	35'-0"										
	601	102	1/2"						4'-3"	FOOTING			B-1
	74	1/2"	4'-8"										
	12	1/2"	2'-0"										
	8	1/2"	28'-0"										
	8	1/2"	50'-0"										
	401	50	1/2"						2'-6"				
26	1/2"	11'-11"											
10	1/2"	11'-3"											
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"	WARPED SECTION			A-1							
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"											
601	102	1/2"					4'-3"	FOOTING			B-1		
74	1/2"	4'-8"											
12	1/2"	2'-0"											
8	1/2"	28'-0"											
8	1/2"	50'-0"											
401	50	1/2"					2'-6"						
26	1/2"	11'-11"											
10	1/2"	11'-3"											
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"	WARPED SECTION			A-1							
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"											
601	102	1/2"					4'-3"	FOOTING			B-1		
74	1/2"	4'-8"											
12	1/2"	2'-0"											
8	1/2"	28'-0"											
8	1/2"	50'-0"											
401	50	1/2"					2'-6"						
26	1/2"	11'-11"											
10	1/2"	11'-3"											
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"	WARPED SECTION			A-1							
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"											
601	102	1/2"					4'-3"	FOOTING			B-1		
74	1/2"	4'-8"											
12	1/2"	2'-0"											
8	1/2"	28'-0"											
8	1/2"	50'-0"											
401	50	1/2"					2'-6"						
26	1/2"	11'-11"											
10	1/2"	11'-3"											
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"	WARPED SECTION			A-1							
10	1/2"	11'-0"											
50	1/2"	6'-0"											
20	1/2"	38'-0"											

ESTIMATED QUANTITIES

TOTAL STEEL REQ'D	92,850 LBS.
" CLASS A-1 CONCRETE REQ'D	180 CY.
" CLASS B-1 CONCRETE REQ'D	138 CY.
" 3/8" x 42" WIRE MESH REQ'D	1250 LBS.
" G.R. PAVING REQ'D	54 CY.
" EXCAVATION FOR STRUCTURE	890 CY.

NOTE: WORK THIS SHEET WITH DRAWING A-4

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
VENT. BLDG ACCESS ROAD PART II  
CULVERT DETAILS - STA. 7+60

ENGINEER: W. LUM & E. W. DATE: JULY 18, 1923  
DRAFTSMAN: E. WATANABE CHECKED BY: W. TOKUSHIGE  
SCALE: AS NOTED TRACER: E. K.  
APPROVED: *W. L. ...* APPROVED: *H. W. ...*  
CHIEF ENGINEER BUREAU ENGINEER

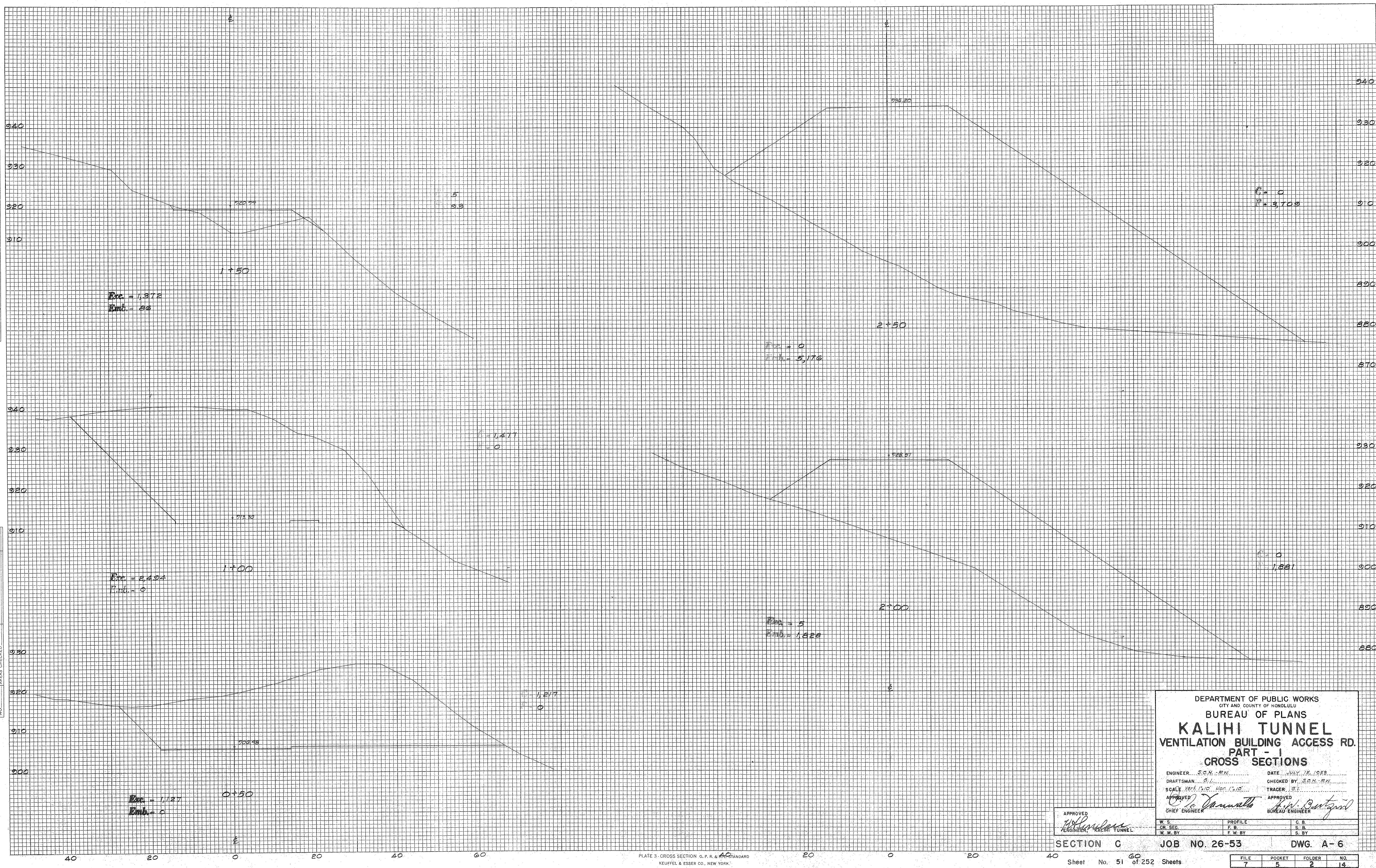
W. S.	C. S.
CR. SEC.	F. B.
W. M. BY.	F. W. BY.
C. S.	C. S.
F. B.	F. B.
F. W. BY.	F. W. BY.

SECTION C JOB NO. 26-53 DWG. A-5



FINAL SURVEY PLOTTED DATE  
 NOTE BOOK NO. AREAS CHECKED

ORIGINAL SURVEY PLOTTED DATE  
 NOTE BOOK NO. AREAS CHECKED



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 VENTILATION BUILDING ACCESS RD.  
 PART - I  
 CROSS SECTIONS

ENGINEER: S.C.H.-R.W. DATE: JULY 15, 1953  
 DRAFTSMAN: G.L. CHECKED BY: S.C.H.-R.W.  
 SCALE: Vert. 1"=10' Hor. 1"=10' TRACER: S.L.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*[Signature]*  
 ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	C. S.
CR. SEC.	F. B.	S. B.
W. M. BY	F. W. BY	S. BY

SECTION C JOB NO. 26-53 DWG. A-6

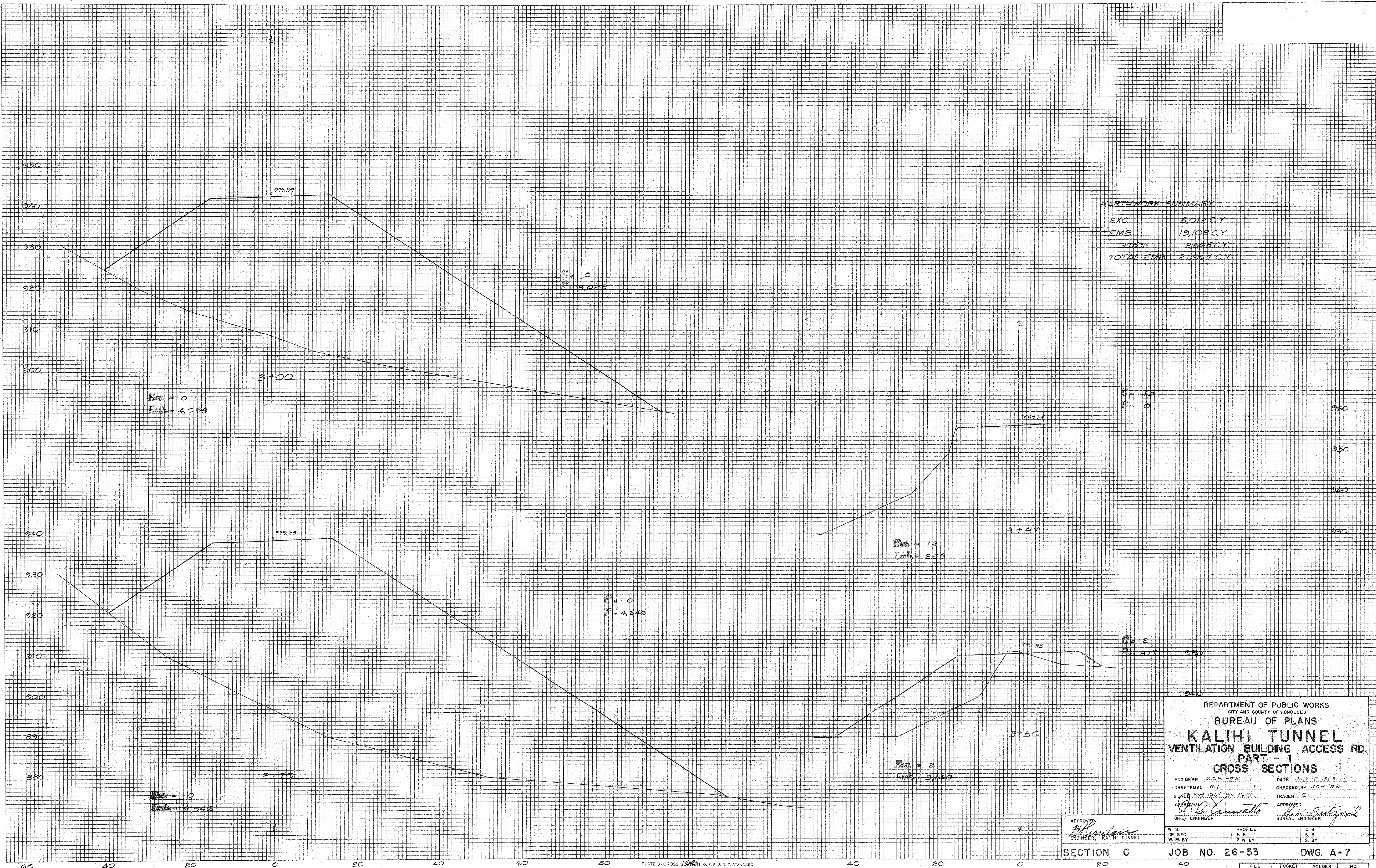
Sheet No. 51 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	2	14



DATE \_\_\_\_\_  
 BY \_\_\_\_\_  
 SURVEYED \_\_\_\_\_  
 PLOTTED \_\_\_\_\_  
 FINAL SURVEY \_\_\_\_\_  
 NOTE BOOK \_\_\_\_\_  
 NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_

DATE \_\_\_\_\_  
 BY \_\_\_\_\_  
 SURVEYED \_\_\_\_\_  
 PLOTTED \_\_\_\_\_  
 ORIGINAL SURVEY \_\_\_\_\_  
 NOTE BOOK \_\_\_\_\_  
 NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_



**EARTHWORK SUMMARY**

EXC.	5,012 C.Y.
EMB.	19,102 C.Y.
+18% EMB.	2,265 C.Y.
<b>TOTAL EMB.</b>	<b>21,367 C.Y.</b>

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 VENTILATION BUILDING ACCESS RD.  
 PART - 1  
**CROSS SECTIONS**

ENGINEER... S.O.M. - R.M. DATE... JULY 15, 1933  
 DRAFTSMAN... G.L. CHECKED BY... S.O.M. - R.M.  
 SCALE... Vert. 1" = 10' Hor. 1" = 10' TRACER... G.L.  
 APPROVED... *C. Yamamoto* APPROVED... *H.W. Baetzold*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*[Signature]*  
 ENGINEER, KALIHI TUNNEL

W.S.	PROFILE	C.B.
OR SEC.	F.S.	S.B.
W.M.B.Y.	F.W.B.Y.	S.B.Y.

SECTION C JOB NO. 26-53 DWG. A-7

Sheet No. 52 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	2	15



FINAL SURVEY PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 SURVEYED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 PLOTTED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 AREA CHECKED \_\_\_\_\_

ORIGINAL SURVEY PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 SURVEYED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 PLOTTED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 AREA CHECKED \_\_\_\_\_

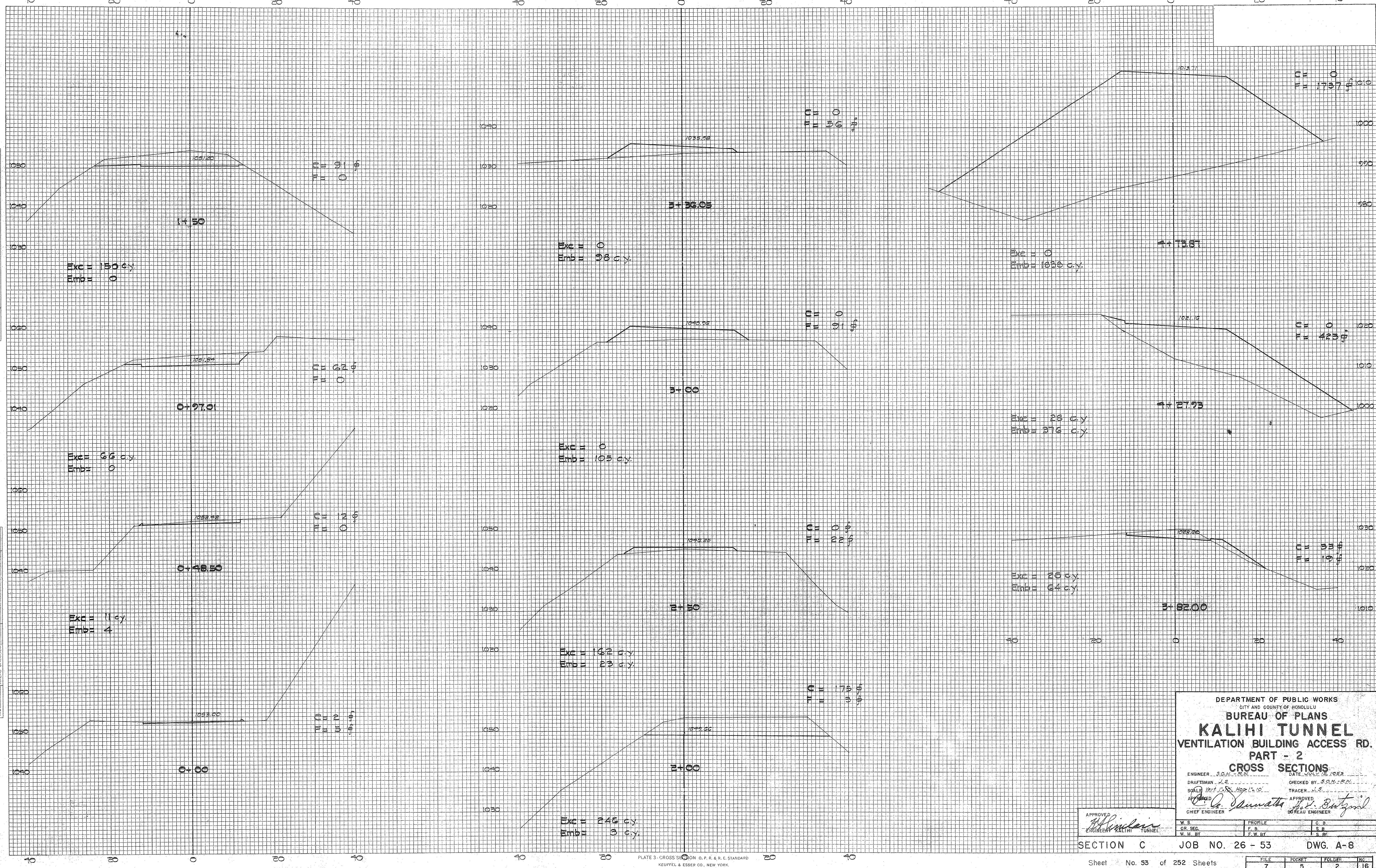


PLATE 3 - CROSS SECTION O. P. R. & R. E. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK.

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 VENTILATION BUILDING ACCESS RD.  
 PART - 2  
 CROSS SECTIONS

ENGINEER S.O.H.-R.M. DATE JULY 18, 1929  
 DRAFTSMAN J.E. CHECKED BY S.O.H.-R.M.  
 SCALE Vert. 1" = 10' Horiz. 1" = 10'  
 TRACER J.S.  
 APPROVED *C. O. Sawwath* CHIEF ENGINEER  
 APPROVED *H. B. Butz* BUREAU ENGINEER

APPROVED  
*H. B. Butz*  
 ENGINEER KALIHI TUNNEL

SECTION C JOB NO. 26 - 53 DWG. A-8

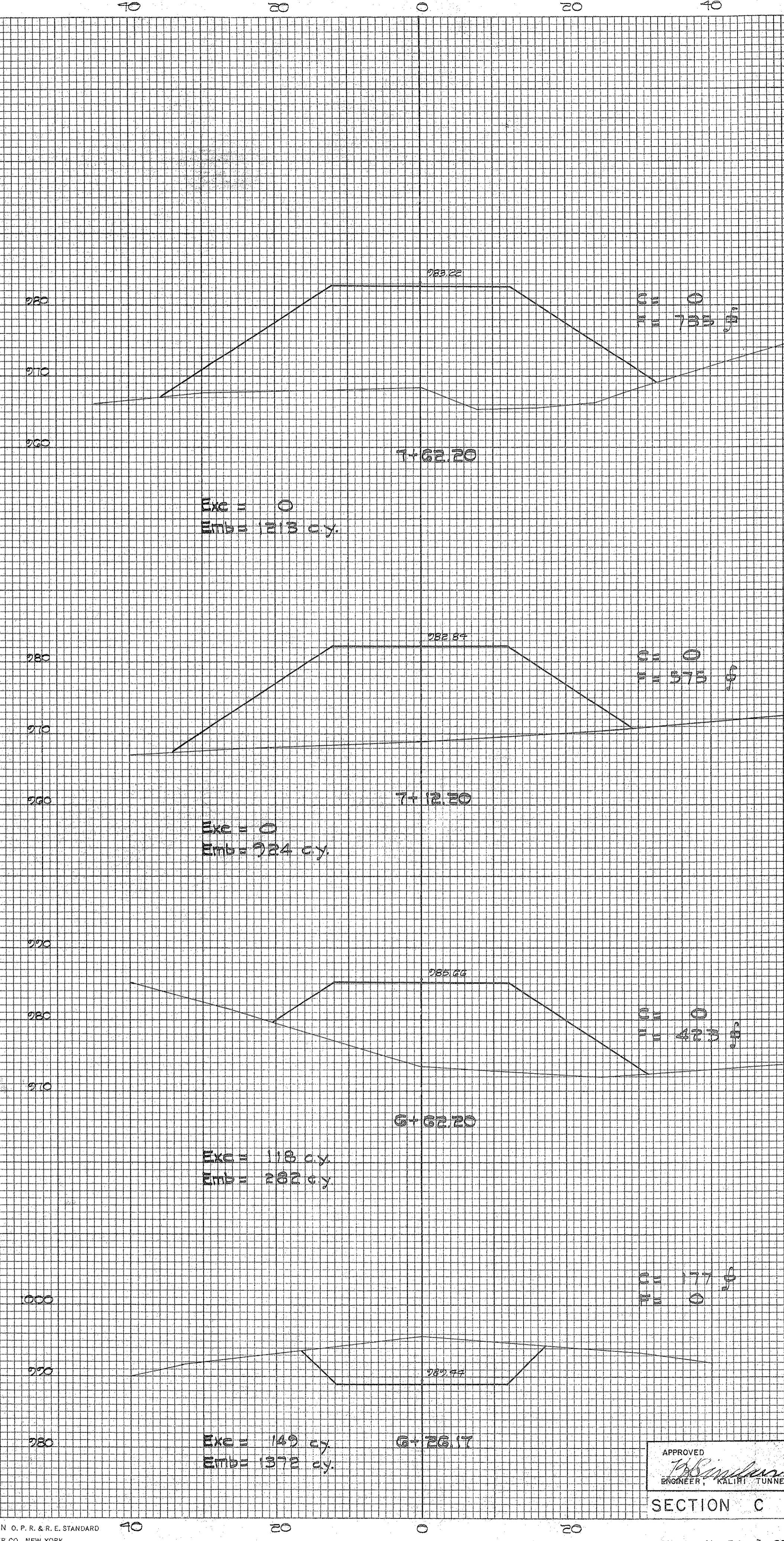
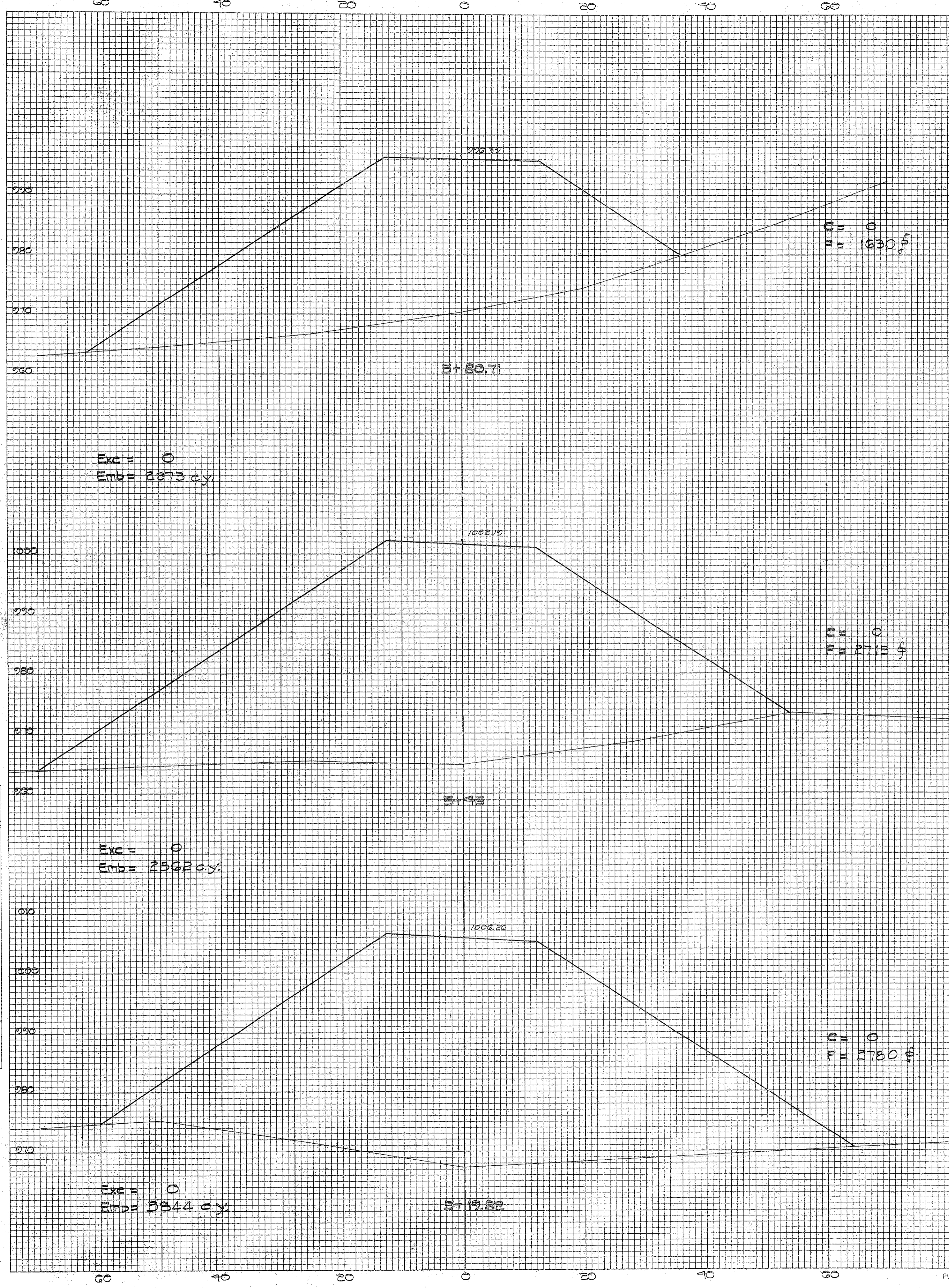
Sheet No. 53 of 252 Sheets

FILE	POCKET	FOLDER	NO.
7	5	2	16



FINAL SURVEY BY DATE  
 SURVEYED PLOTTED  
 NOTE BOOK TEMPLATE  
 AREAS CHECKED  
 NO.

ORIGINAL SURVEY BY DATE  
 SURVEYED PLOTTED  
 NOTE BOOK TEMPLATE  
 AREAS CHECKED  
 NO.



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHI TUNNEL**  
 VENTILATION BUILDING ACCESS RD.  
 PART - 2  
**CROSS SECTIONS**

ENGINEER: S.O.M. R.N. DATE: JUL 12, 1968  
 DRAFTSMAN: J.S. CHECKED BY: S.O.M. R.N.  
 SCALE: 1/2" = 10' HORIZ. 1/4" = 10' VERT. TRACER: J.S.  
 APPROVED: *Le. Danwith* APPROVED: *W. B. Burtford*  
 CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. SFC.	F. B.	S. B.
W. M. BY	F. W. BY	S. BY

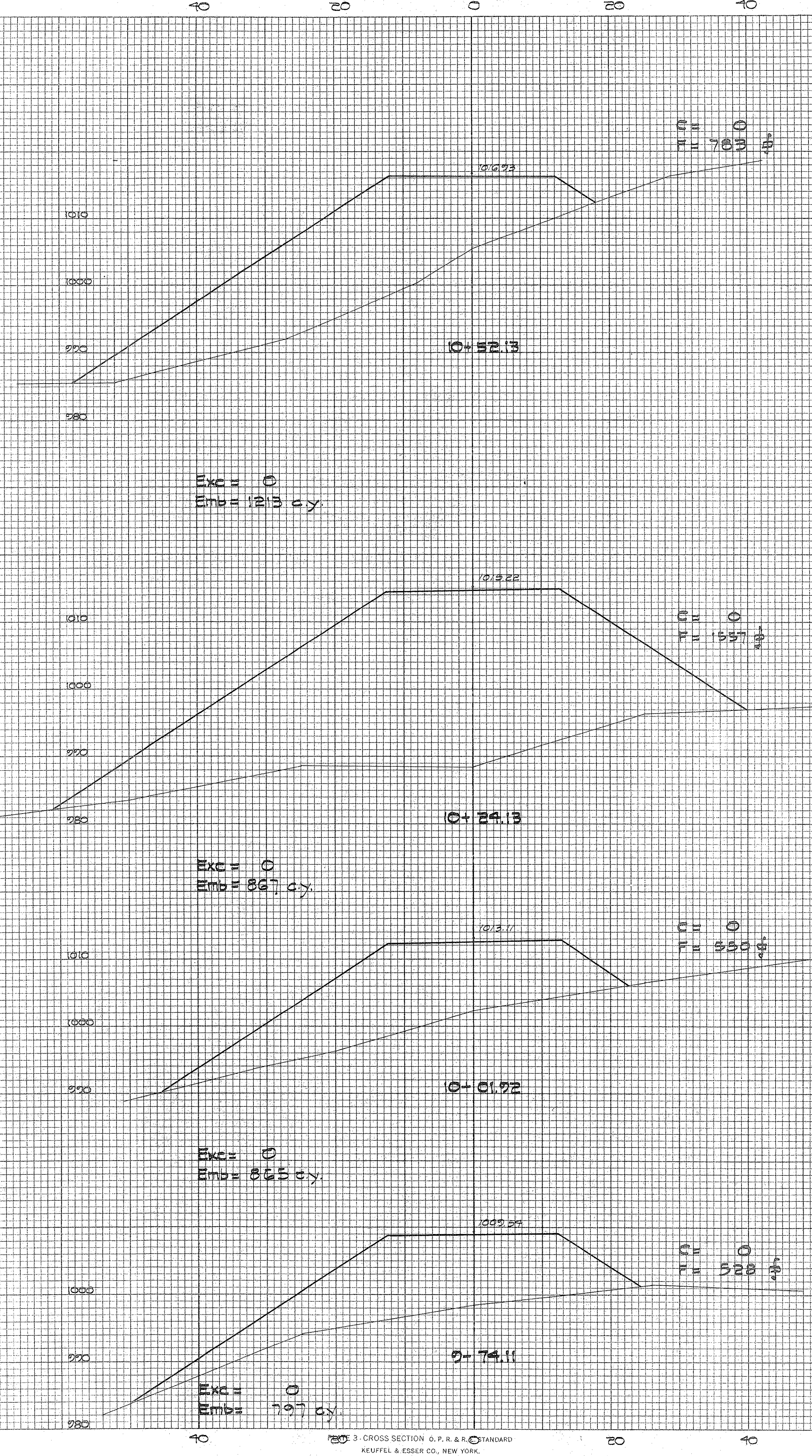
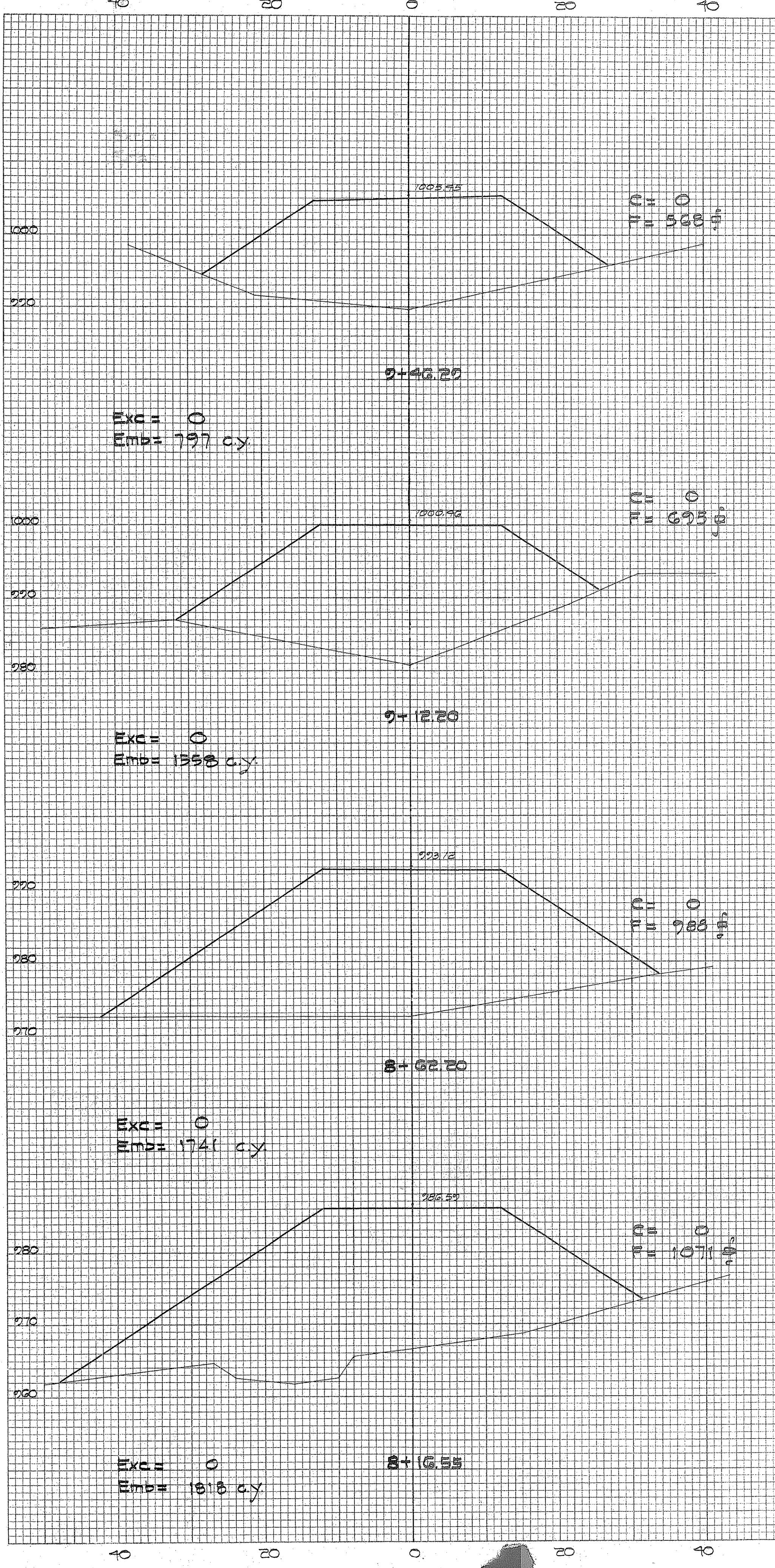
SECTION C JOB NO. 26 - 53 DWG. A-9

FILE	POCKET	FOLDER	NO.
7	5	2	17



FINAL SURVEYED SURVEY PLOTTED NOTE BOOK NO. BY DATE

ORIGINAL SURVEYED SURVEY PLOTTED NOTE BOOK NO. BY DATE



SECTION C CROSS SECTION O. P. R. & R. STANDARD KEUFFEL & ESSER CO., NEW YORK.

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
VENTILATION BUILDING ACCESS RD.  
PART - 2  
CROSS SECTIONS

ENGINEER S.O.H. DATE JULY 18, 1958  
DRAFTSMAN Y.N.  
SCALE Vert. 1"=10' Hor. 1"=10'  
TRACER L.S.  
APPROVED  
S.O.H. CHIEF ENGINEER  
H.W. BOUTGARD BUREAU ENGINEER

APPROVED  
ENGINEER KALIHI TUNNEL

SECTION C JOB NO. 26-53 DWG. A-10

Sheet No. 55 of 252 Sheets

FILE	PROJECT	FOLDER	NO.
7	5	2	18



FINAL SURVEY SURVEYED BY DATE  
 SURVEY PLOTTED BY DATE  
 NOTE BOOK NO. TEMPLATE AREAS CHECKED

ORIGINAL SURVEY SURVEYED BY DATE  
 SURVEY PLOTTED BY DATE  
 NOTE BOOK NO. TEMPLATE AREAS CHECKED

1010  
1020  
1030  
1040  
1050  
1060  
1070  
1080  
1090  
1100



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 VENTILATION BUILDING ACCESS RD.  
 PART - 2  
 CROSS SECTIONS

ENGINEER: S.C.M. DATE: JULY 18, 1963  
 DRAFTSMAN: Y.N. CHECKED BY: S.C.M.  
 SCALE: Vert. 1"=10' Hor. 1"=100'  
 APPROVED: *[Signature]* CHIEF ENGINEER  
 APPROVED: *[Signature]* BUREAU ENGINEER

APPROVED: *[Signature]*  
 ENGINEER, KALIHI TUNNEL

W.S.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M. BY:	F.W. BY:	S. BY:

SECTION C JOB NO. 26-53 DWG. A-11

Sheet No. 56 of 252 Sheets

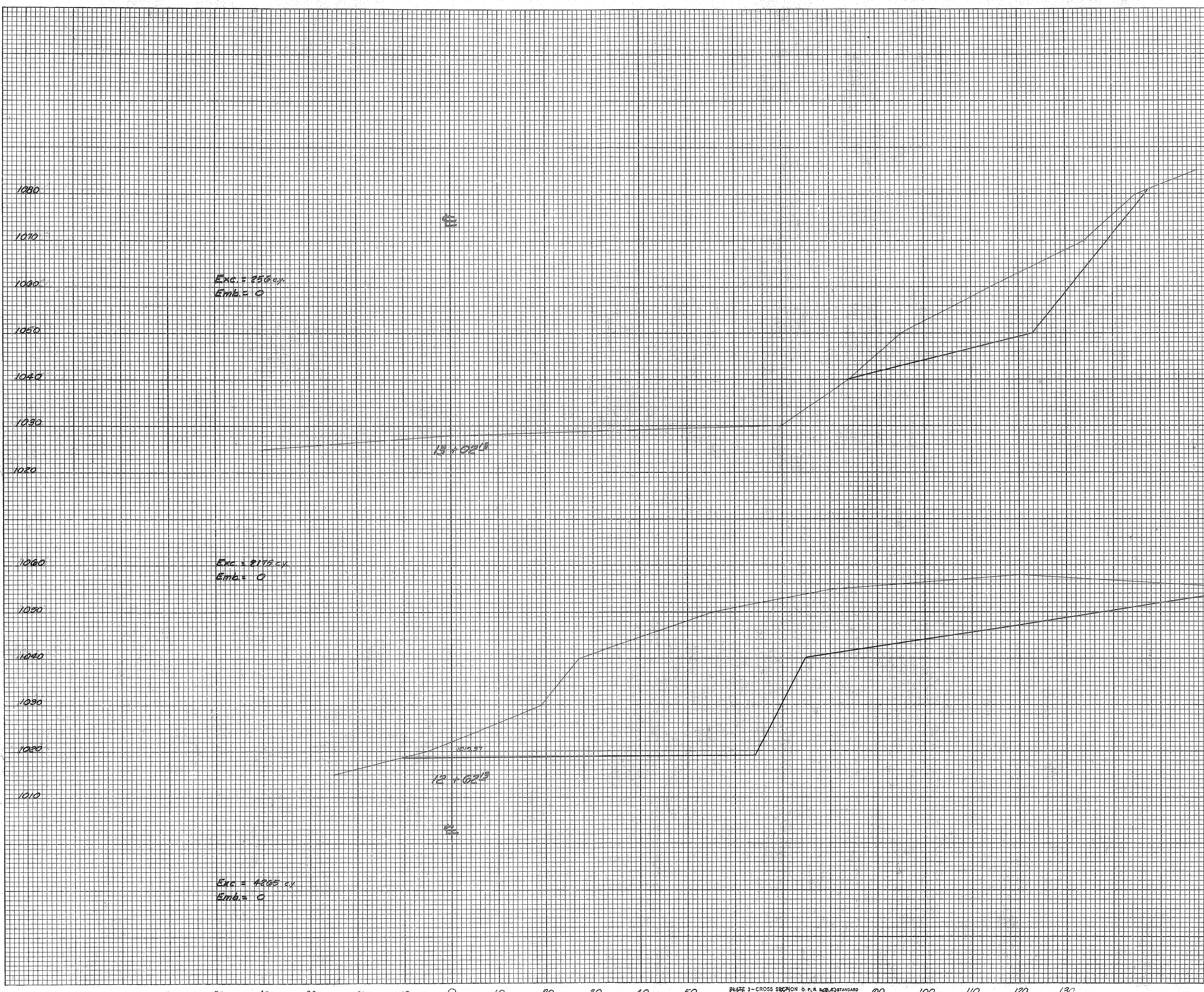
FILE	POCKET	FOLDER	NO.
7	5	2	19

SCALE 3" CROSS SECTION ON G.P.R. & R. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK.



FINAL SURVEY NOTE BOOK NO. \_\_\_\_\_  
 SURVEYED BY \_\_\_\_\_  
 PLOTTED BY \_\_\_\_\_  
 TEMPLATE NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_

ORIGINAL SURVEY NOTE BOOK NO. \_\_\_\_\_  
 SURVEYED BY \_\_\_\_\_  
 PLOTTED BY \_\_\_\_\_  
 TEMPLATE NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_



**EARTHWORK SUMMARY**

EXC.	11,418 C.Y.
EMB.	22,181 C.Y.
+15%	4,221 C.Y.
TOTAL EMB.	32,402 C.Y.

C = 5:2 #  
 F = 0

C = 2:2 #  
 F = 0

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 VENTILATION BUILDING ACCESS RD.  
 PART - 2  
 CROSS SECTIONS

ENGINEER: S.O.H. S.W. DATE: JULY 15, 1932  
 DRAFTSMAN: G.L. CHECKED BY: S.O.H. S.W.  
 SCALE: Vert. 1" = 10' Hor. 1" = 10'  
 TRACER: G.L.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

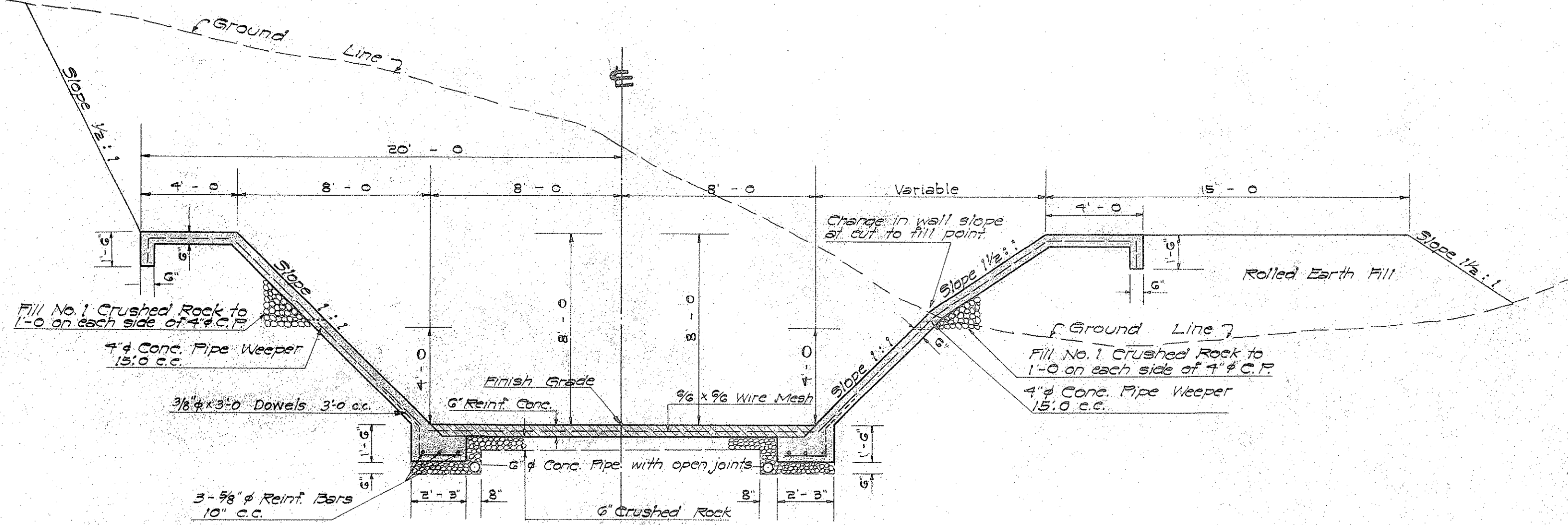
APPROVED  
*[Signature]*  
 ENGINEER KALIHI TUNNEL

W. S.	PROFILE	C. D.
GR. SEC.	F. B.	S. B.
W. M. BY:	F. W. BY:	S. BY:

SECTION C JOB NO. 26-53 DWG. A-12

FILE	POCKET	FOLDER	NO.
7	5	2	20

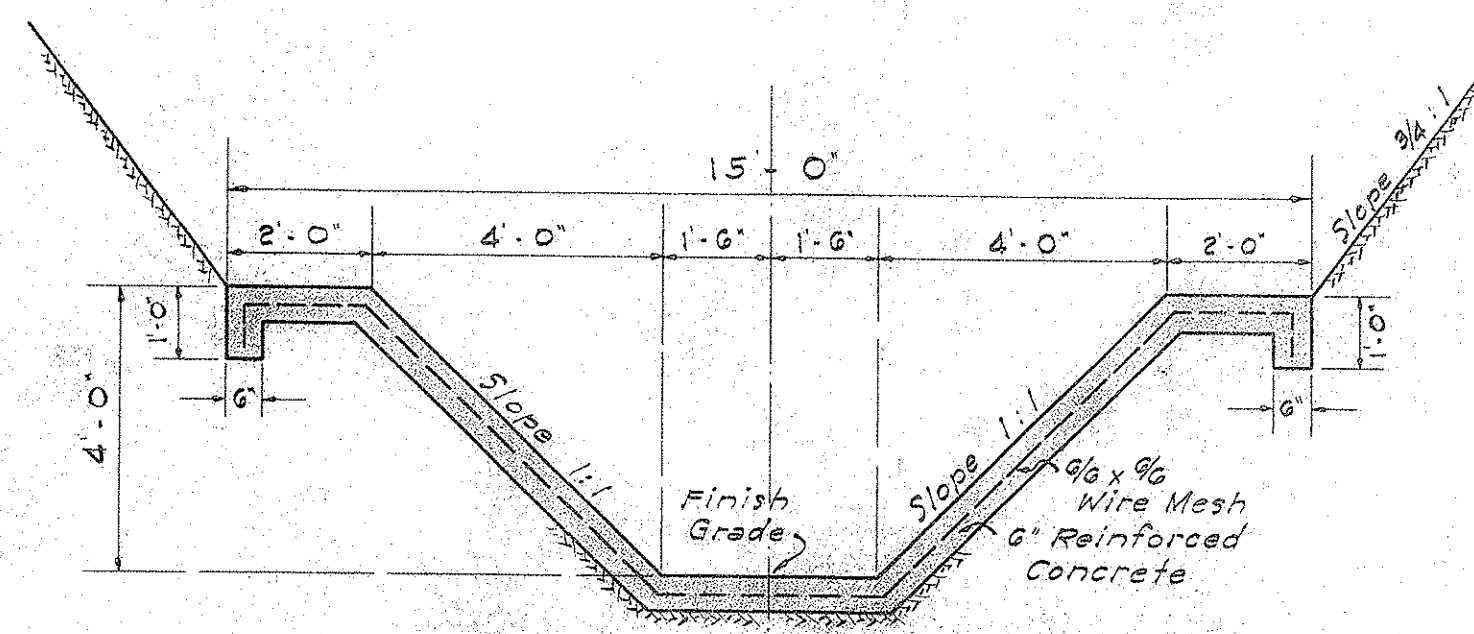




SECTION IN CUT

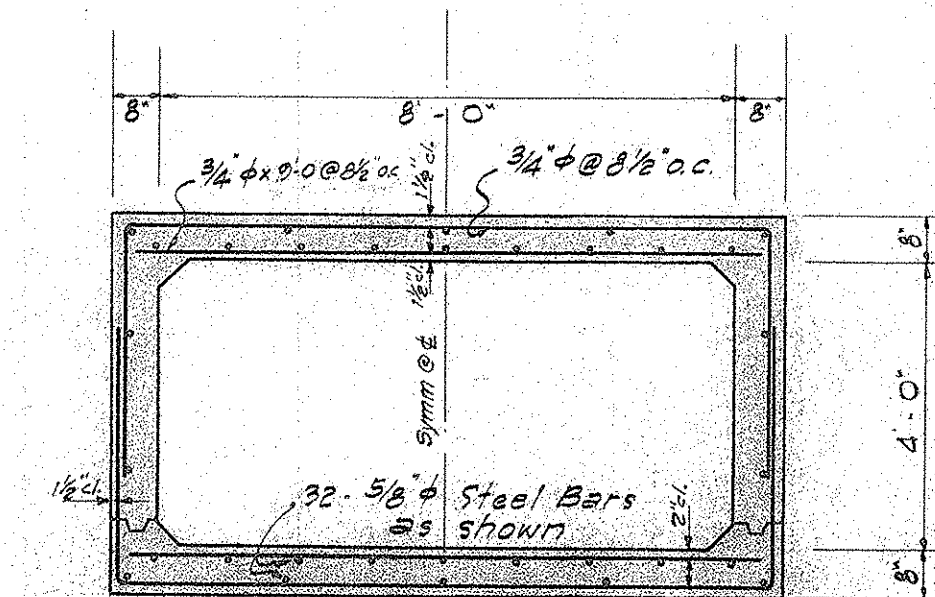
SECTION IN CUT AND FILL

TYPICAL SECTION  
STA. 15+73.33 TO 20+26.25  
Scale: 1/4" = 1'-0"



OPEN CHANNEL

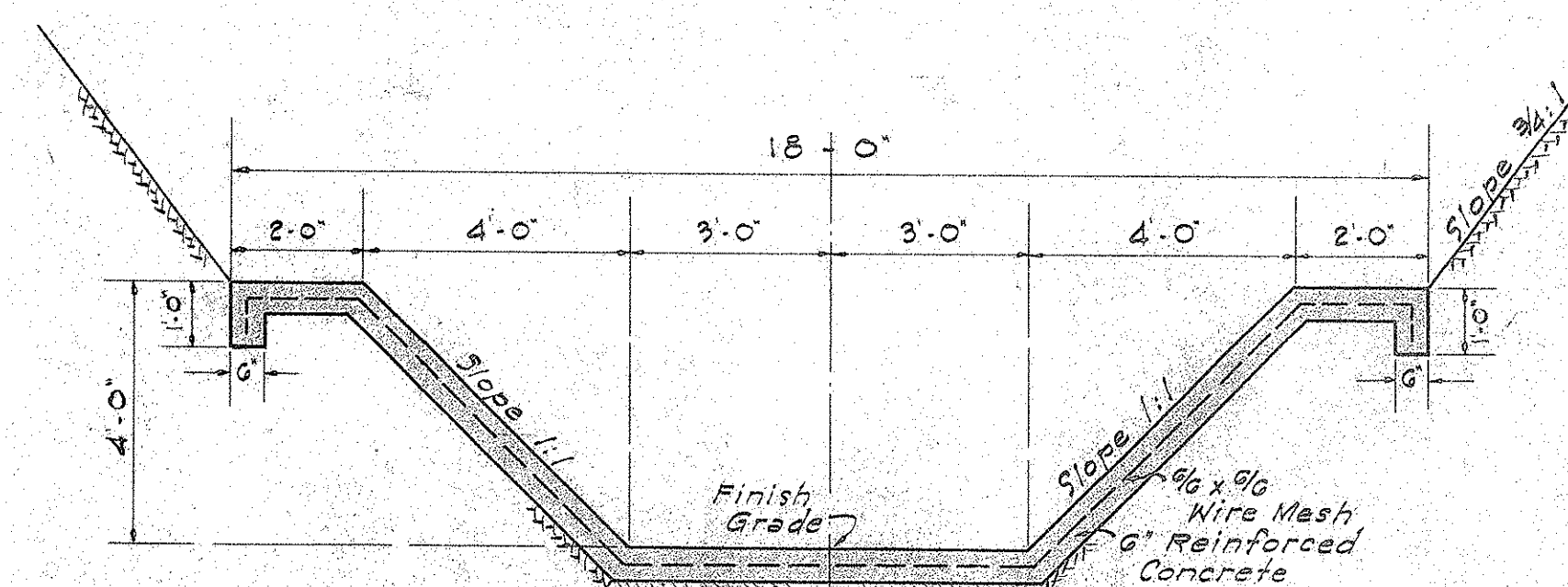
STA. 3+49.00 TO STA. 6+07.35



CLOSED CHANNEL

STA. 0+33.03 TO STA. 0+70 AND  
STA. 1+50 TO STA. 2+00

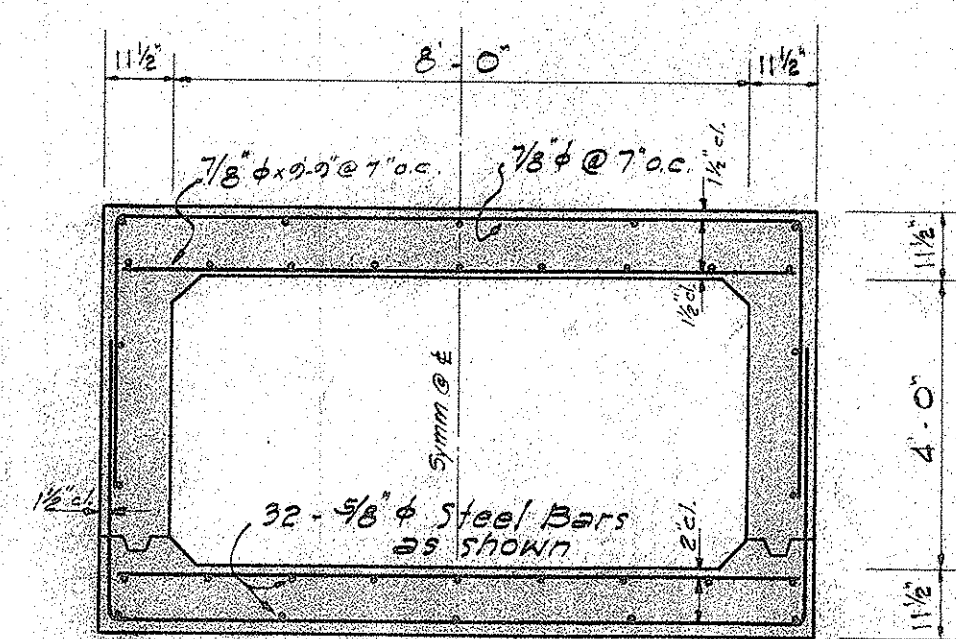
TYPICAL BEND  
FOR TOP & BOTTOM.



OPEN CHANNEL

AT STA. 2+09.00 AND STA. 6+35.00

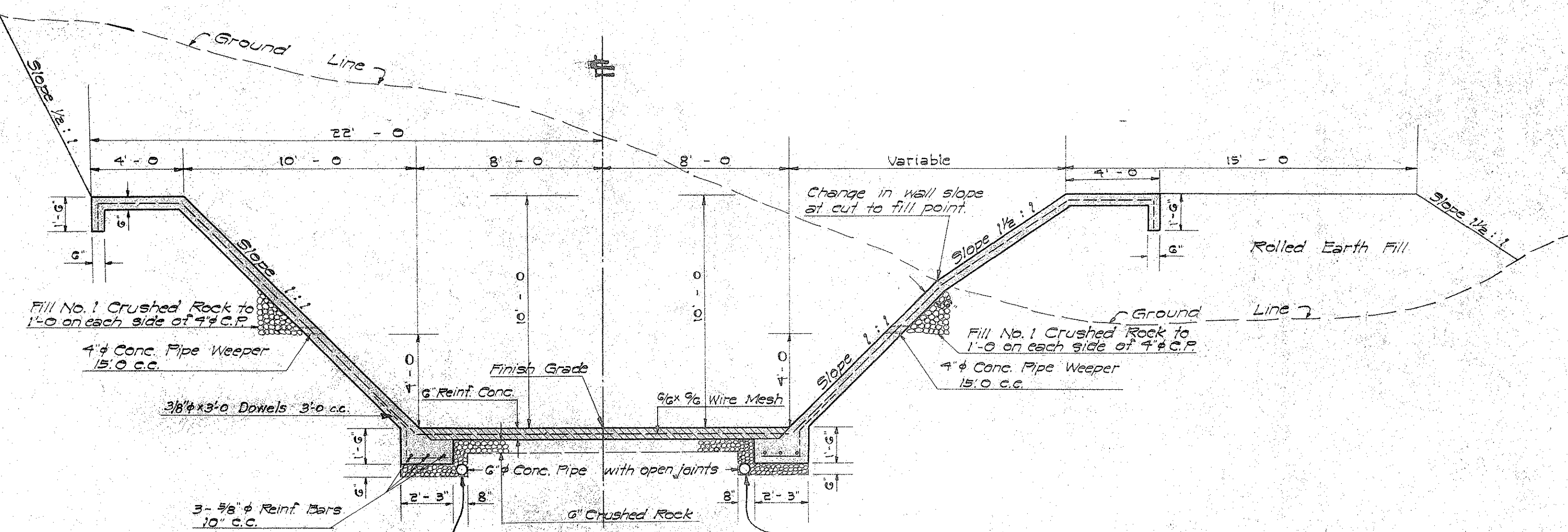
Note: Walls to slope from 0 at sta 2+00 to 1:1 at sta 2+09.00.  
Floor width to narrow from 8'-0" at sta 2+00 to 6'-0" at sta 2+09.00.



CLOSED CHANNEL

STA. 0+70 TO STA. 1+50

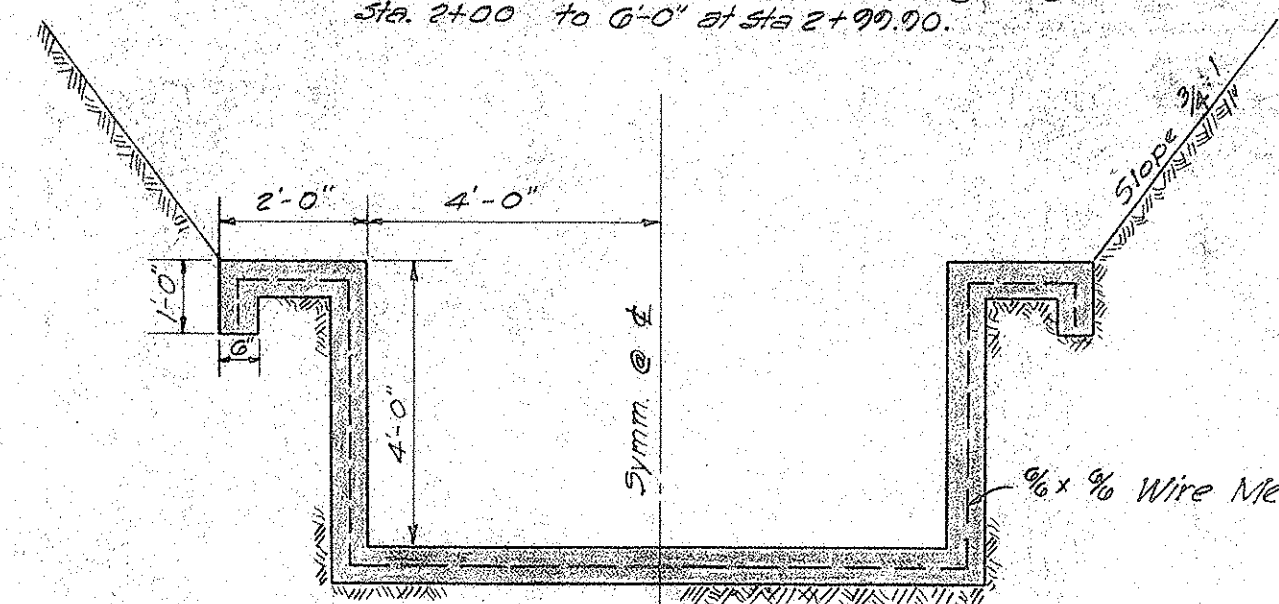
TYPICAL BEND  
FOR TOP & BOTTOM.



SECTION IN CUT

SECTION IN CUT AND FILL

TYPICAL SECTION  
STA. 3+34.67 TO 15+73.33  
Scale: 1/4" = 1'-0"



OPEN CHANNEL

STA. 2+00

TYPICAL SECTIONS

SPUR #7

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

NOTE:  
Concrete to have ultimate compressive strength of 2500 p.s.i. at 28 days.  
Reinforcing steel to be new billet, intermediate grade, deformed bars.

NOTE: Conc. in Main Channel to be "B-1" except for Floor Slab.  
Floor Area (hatched) to be of Special Concrete (see Specification)  
4" Conc. pipe weepers and Crushed Rock Filter Material shall not be paid for separately but shall be incidental to item No. 2-e-1 "B-1" Conc.

MAIN CHANNEL

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
STREAM DIVERSION  
TYPICAL SECTIONS

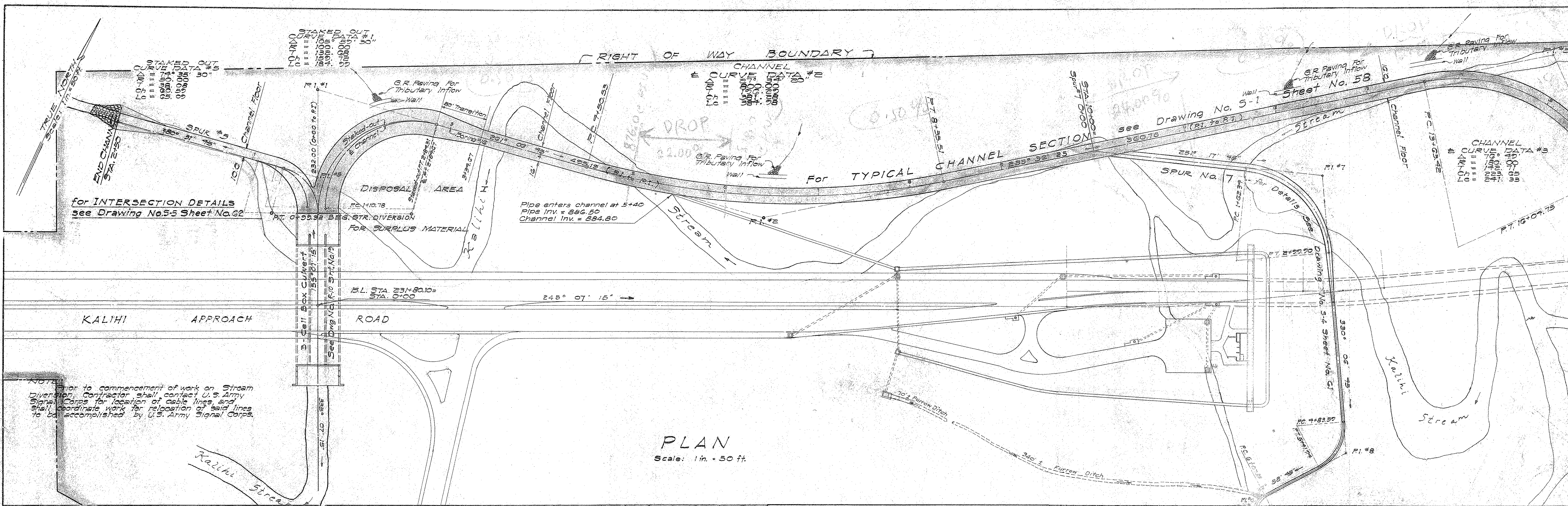
ENGINEER S.O.M. - J.S.S.R. DATE JULY 18, 1952  
DRAFTSMAN J.S. CHECKED BY S.O.M. - R.M.L.  
SCALE As Shown TRACER J.S. - J.K.L.  
APPROVED: *[Signature]* APPROVED: *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

W. S.	PROFILE	C. B.
CR. SEC.	P. B.	S. B.
W. M. BY.	P. W. BY.	S. BY.

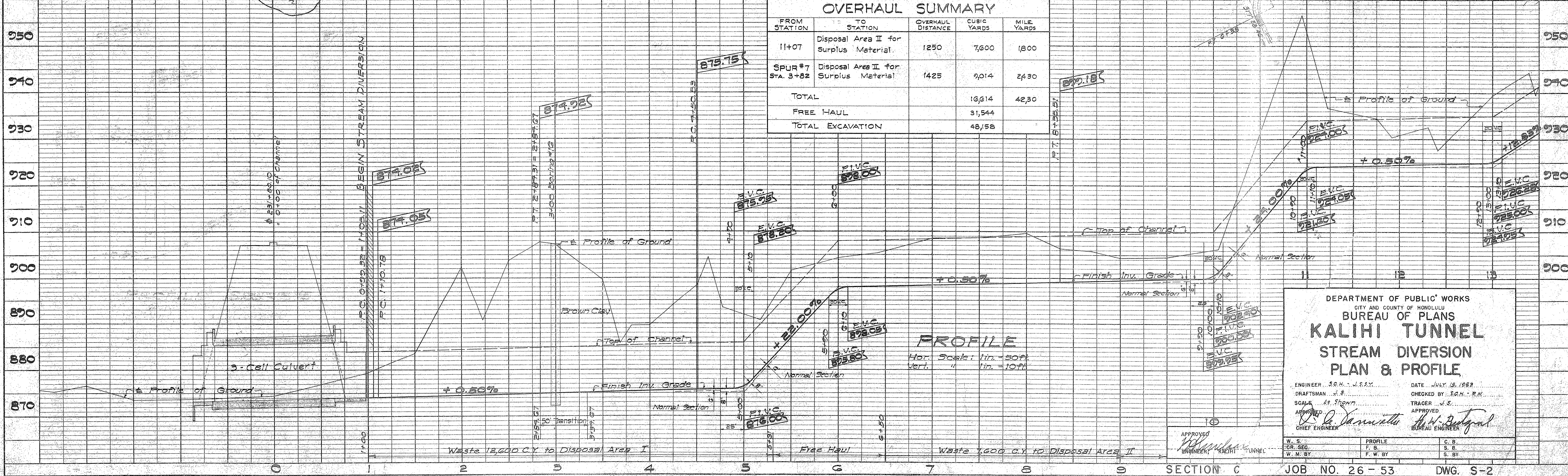


DATE: \_\_\_\_\_ BY: \_\_\_\_\_  
 SURVEYED: \_\_\_\_\_  
 PLOTTED: \_\_\_\_\_  
 NOTE BOOK: \_\_\_\_\_  
 NO. \_\_\_\_\_  
 ALIGNMENT CHECKED: \_\_\_\_\_  
 R.T. OF WAY CHECKED: \_\_\_\_\_

DATE: \_\_\_\_\_ BY: \_\_\_\_\_  
 SURVEYED: \_\_\_\_\_  
 PLOTTED: \_\_\_\_\_  
 NOTE BOOK: \_\_\_\_\_  
 NO. \_\_\_\_\_  
 GROUND CHECKED: \_\_\_\_\_  
 STRUCTURE NOTATION CHECKED: \_\_\_\_\_



PLAN  
 Scale: 1 in. = 50 ft.



PROFILE  
 Hor. Scale: 1 in. = 50 ft.  
 Vert. " " 1 in. = 10 ft.

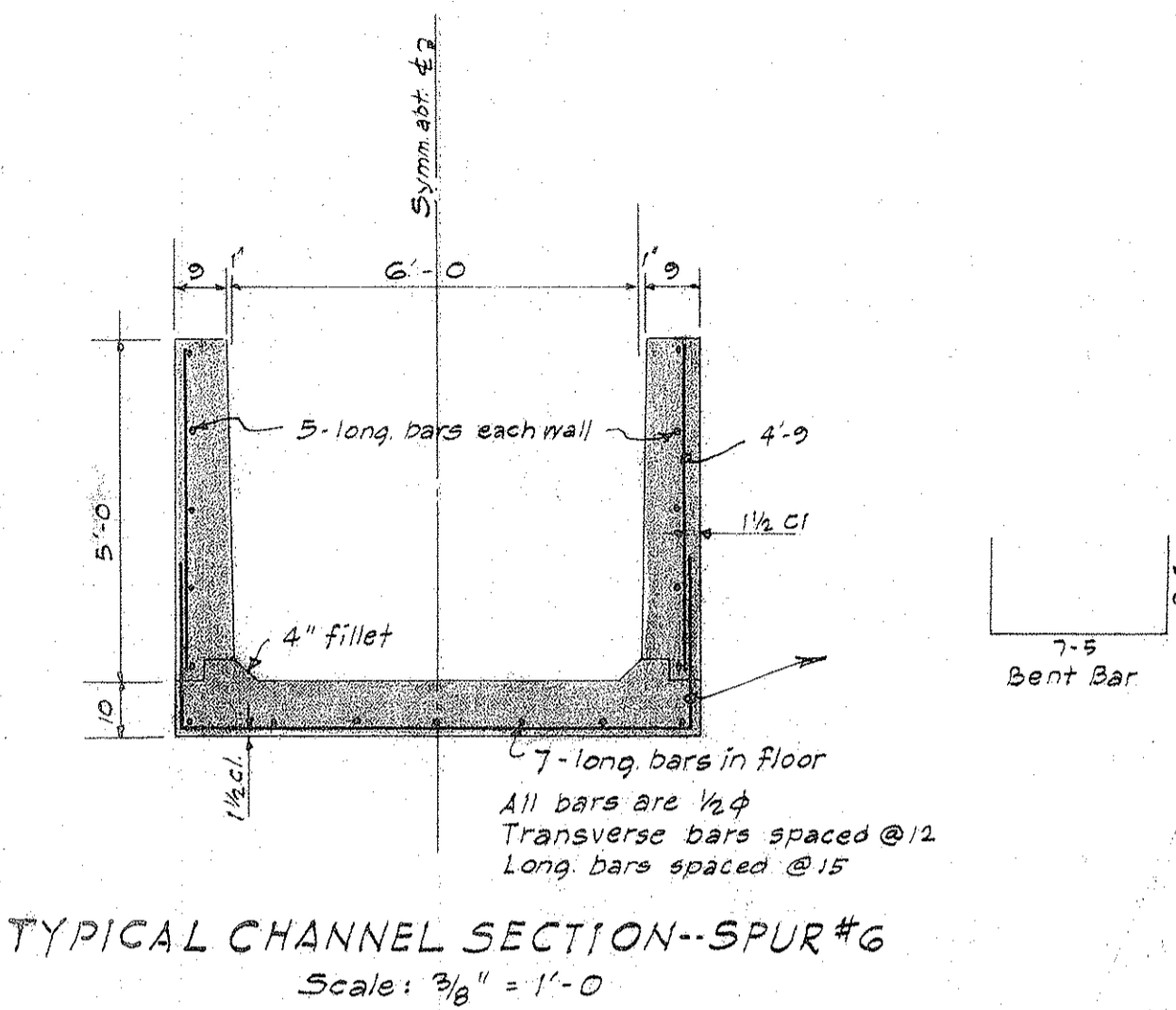
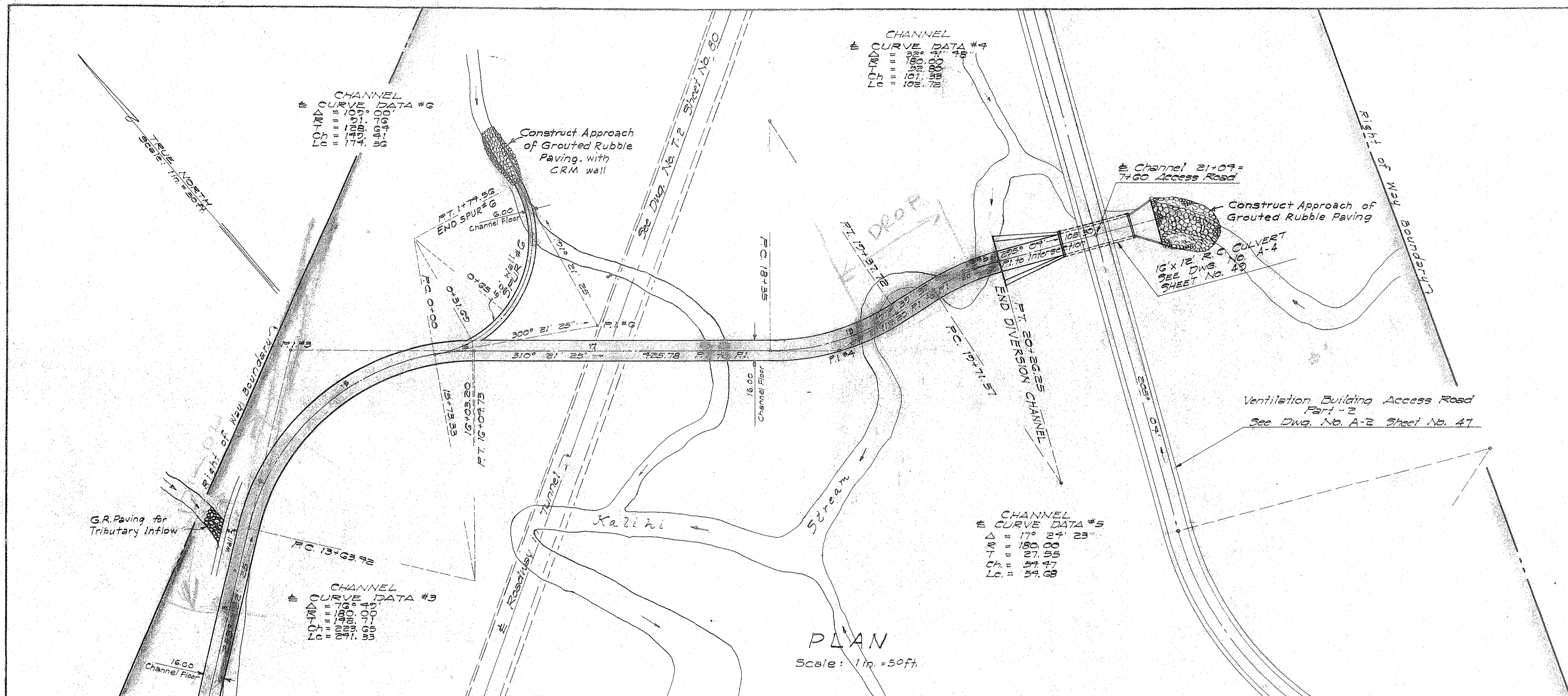
DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 PLAN & PROFILE

ENGINEER: S. H. J. S. X. DATE: JULY 19, 1953  
 DRAFTSMAN: J. S. CHECKED BY: S. H. J. S. X.  
 SCALE: As Shown. TRACER: J. S.  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

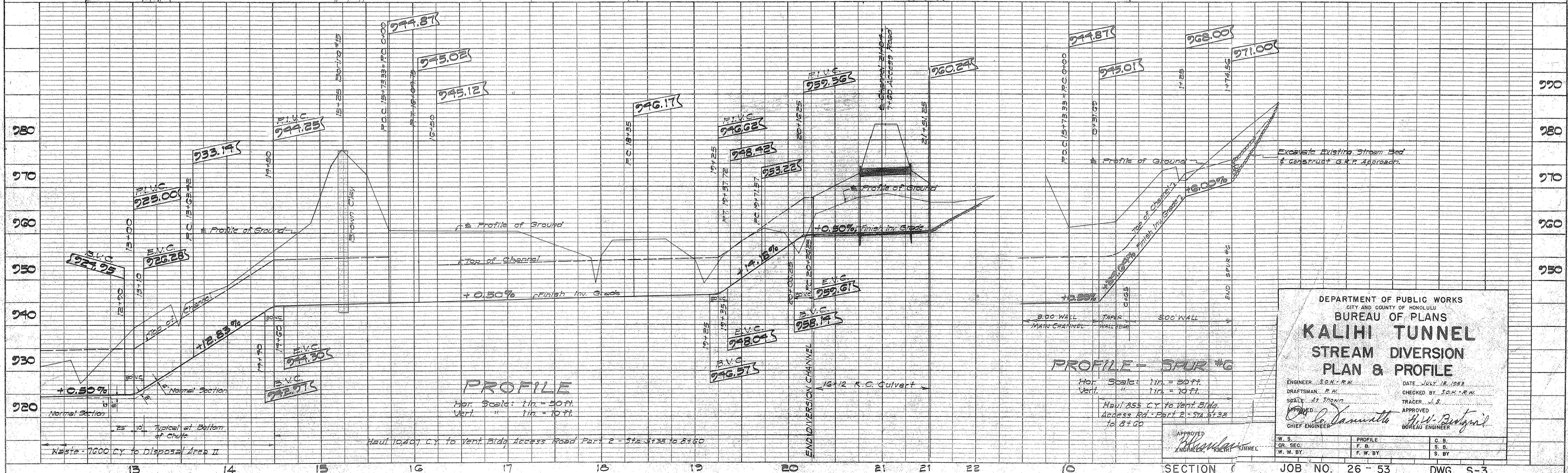
W. S. OR. SEC. F. B. C. B.  
 W. M. BY F. W. BY S. B.  
 S. BY



PLAN	SURVEYED	DATE
	PLOTTED	BY
	NOTE BOOK	
	ALIGNMENT CHECKED	
	RT. OF WAY CHECKED	
	NO.	



PROFILE	SURVEYED	DATE
	PLOTTED	BY
	NOTE BOOK	
	GRADES CHECKED	
	STRUCTURE NOTATIONS CHECKED	
	NO.	



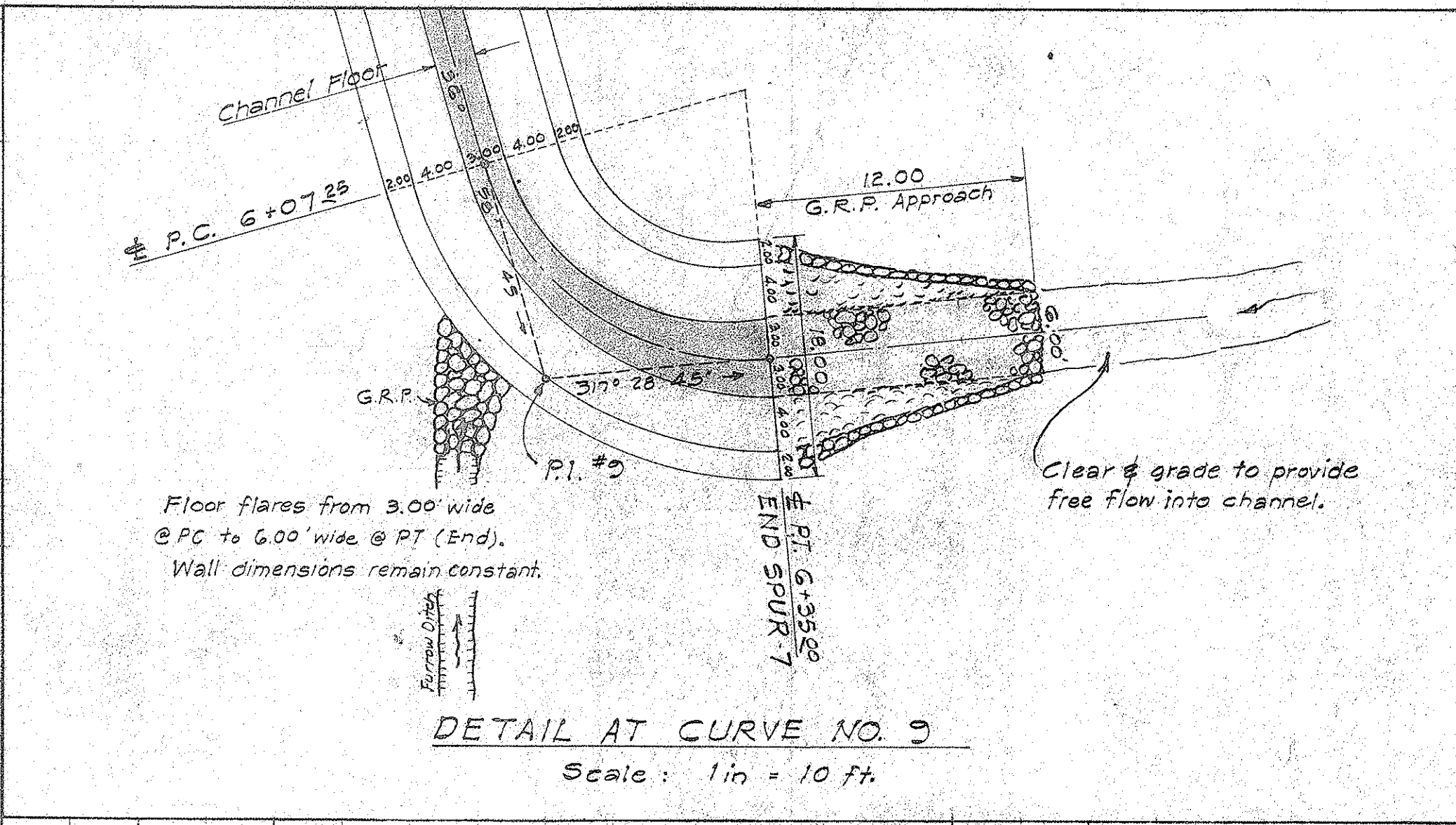
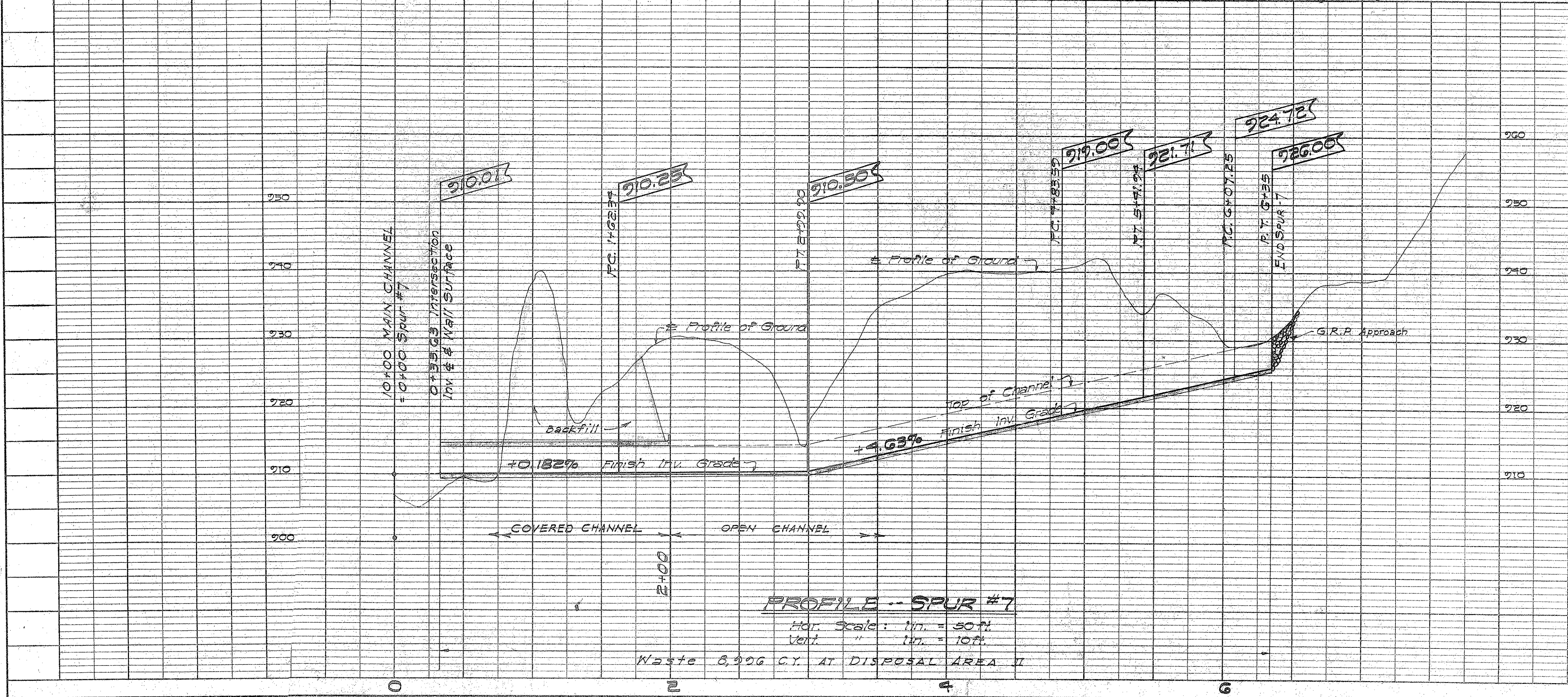
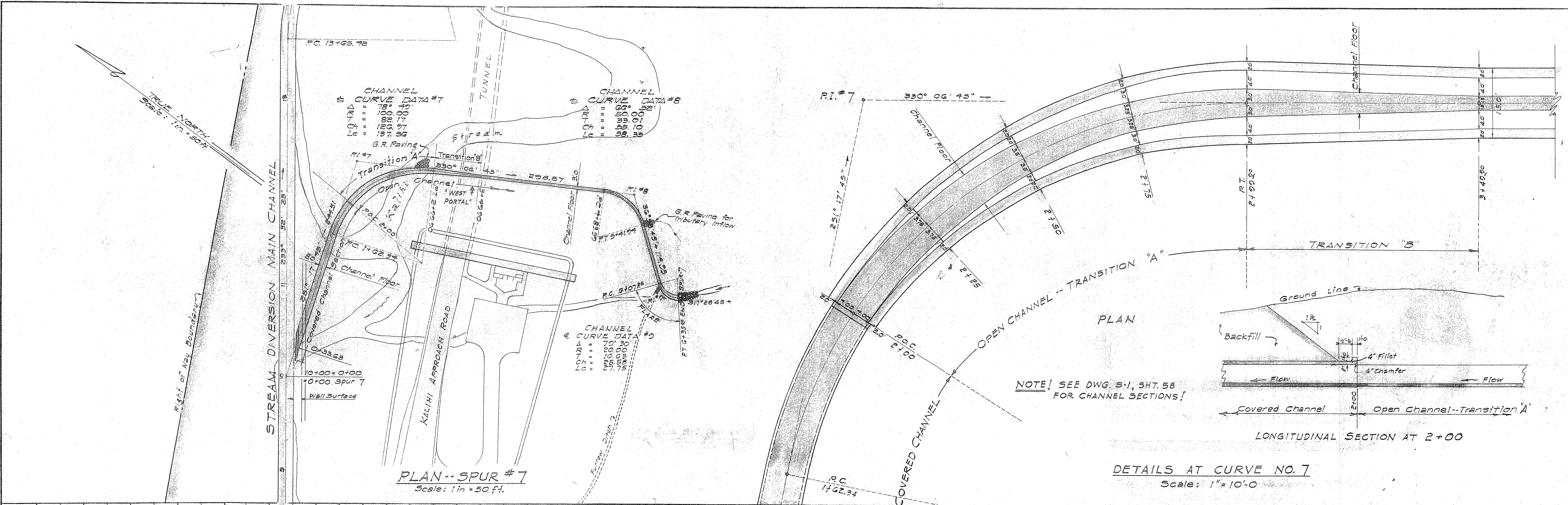
DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL  
STREAM DIVERSION  
PLAN & PROFILE**

ENGINEER: S.O.M.: R.M. DATE: JULY 18, 1958  
DRAFTSMAN: R.M. CHECKED BY: S.O.M.: R.M.  
SCALE: AS SHOWN TRACER: J.S.  
APPROVED: *[Signature]* APPROVED: *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER



DATE	
BY	
SURVEYED	
PLOTTED	
NOTE BOOK	
CHECKED	
RT. OF WAY CHECKED	
NO.	

DATE	
BY	
SURVEYED	
PLOTTED	
NOTE BOOK	
CHECKED	
STRUCTURE NOTATION CH. NO.	
NO.	



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

**KALIHI TUNNEL**  
STREAM DIVERSION  
PLAN & PROFILE - SPUR - 7

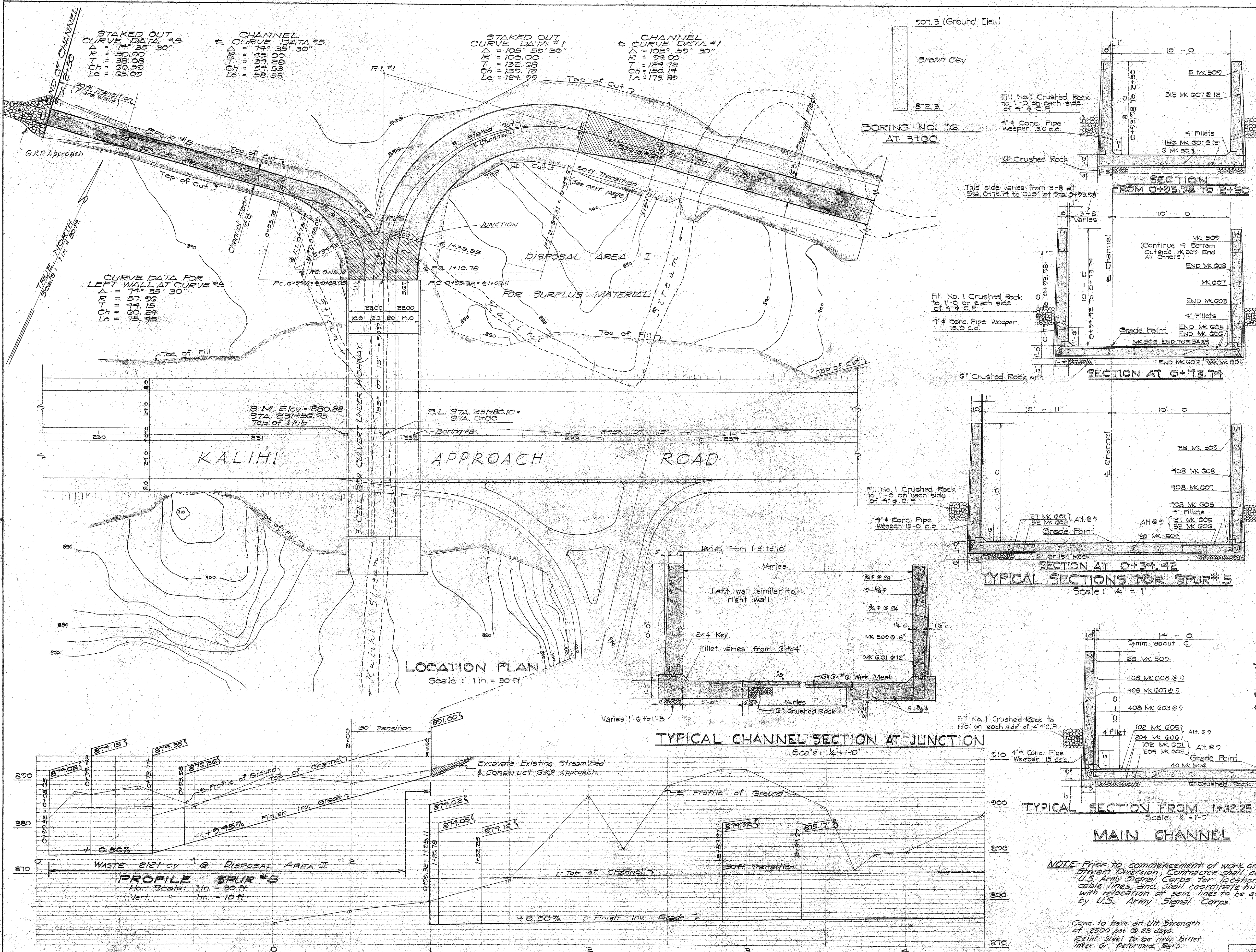
ENGINEER S.C.H.-J.K.I. DATE JULY 15, 1958  
DRAFTSMAN J.K.I. CHECKED BY S.C.H.-R.W.  
SCALE As Shown TRAGER J.S.-J.K.I.  
APPROVED *[Signature]* APPROVED *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
ENGINEER KALIHI TUNNEL

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
R. N. BY	P. W. BY	S. BY

SECTION C JOB NO. 26-53 DWG. S-4





**REINFORCING BAR SCHEDULE**

BENDING DIAGRAMS	MARK	NO.	SIZE	LENGTH	REMARKS
<b>STA. 1+32.25 TO 2+84.67</b>					
	G01	102	3/4"	30'-0"	
	G02	204	3/4"	8'-0"	
	G03	408	3/4"	1'-3"	
	G04	40	5/8"	Varies	All bars concentric to E. Curve, Total = 6047 L.F.
	G05	102	3/4"	31'-6"	Standard Hook
	G06	204	3/4"	5'-8"	Standard Hook
	G07	408	3/4"	9'-9"	Straight
	G08	408	3/4"	9'-5"	Straight
	G09	28	5/8"	Varies	Total = 148 L.F.
<b>QUANTITIES REQ'D:</b>					
"B-1" CONC: 289.6 C.Y.					
STEEL: 98,800 LB.					
<b>CURVE #5 STA. 0+34.42 TO 0+73.78</b>					
	G01	47	3/4"	Varies	Total = 1214-5 L.F.
	G02	94	3/4"	8'-0"	
	G03	188	3/4"	1'-3"	Bars under left wall concentric to left wall curve, all others concentric to E. Curve.
	G04	28	5/8"	Varies	Total = 1196 L.F.
	G05	21	3/4"	Varies	Total = 597-3 L.F.
	G06	52	3/4"	5'-8"	
	G07	146	3/4"	Varies	108 @ 9'-9" Straight Bars
	G08	108	3/4"	9'-5"	Straight
	G09	28	5/8"	Varies	18 @ 11'-5" @ 11'-0" with 18 @ 11'-5" @ 11'-0" @ 11'-0" with 18 @ 11'-5" @ 11'-0"
<b>QUANTITIES REQ'D:</b>					
"B-1" CONC: 81.1 C.Y.					
STEEL: 10,423 LB.					
<b>CURVE #5 STA. 0+73.78 TO 2+50</b>					
	G01	156	3/4"	18'-3"	
	G02	8	5/8"	18'-0"	Straight
	G03	312	3/4"	7'-9"	Straight
	G04	10	5/8"	18'-0"	Straight
<b>QUANTITIES REQ'D:</b>					
"B-1" CONC: 1652 C.Y.					
STEEL: 8076 LB.					
<b>JUNCTION</b>					
	509	33	5/8"	8'-9"	
	G01	48	3/4"	10'-3"	
	G02	36	3/4"	9'-3"	Straight
	G03	28	5/8"	Varies	Straight 14 @ 25'
	G04	28	5/8"	5'-7"	Straight
	G05	6x6			*6 Wire Mesh (Area=1020#)
<b>QUANTITIES REQ'D:</b>					
"B-1" CONC: 58.0 C.Y.					
STEEL: 1854 LB.					

NOTE: This Schedule is prepared for Estimating purposes only. Contractor to verify Quantities and Dimensions for final Bending and Placing.

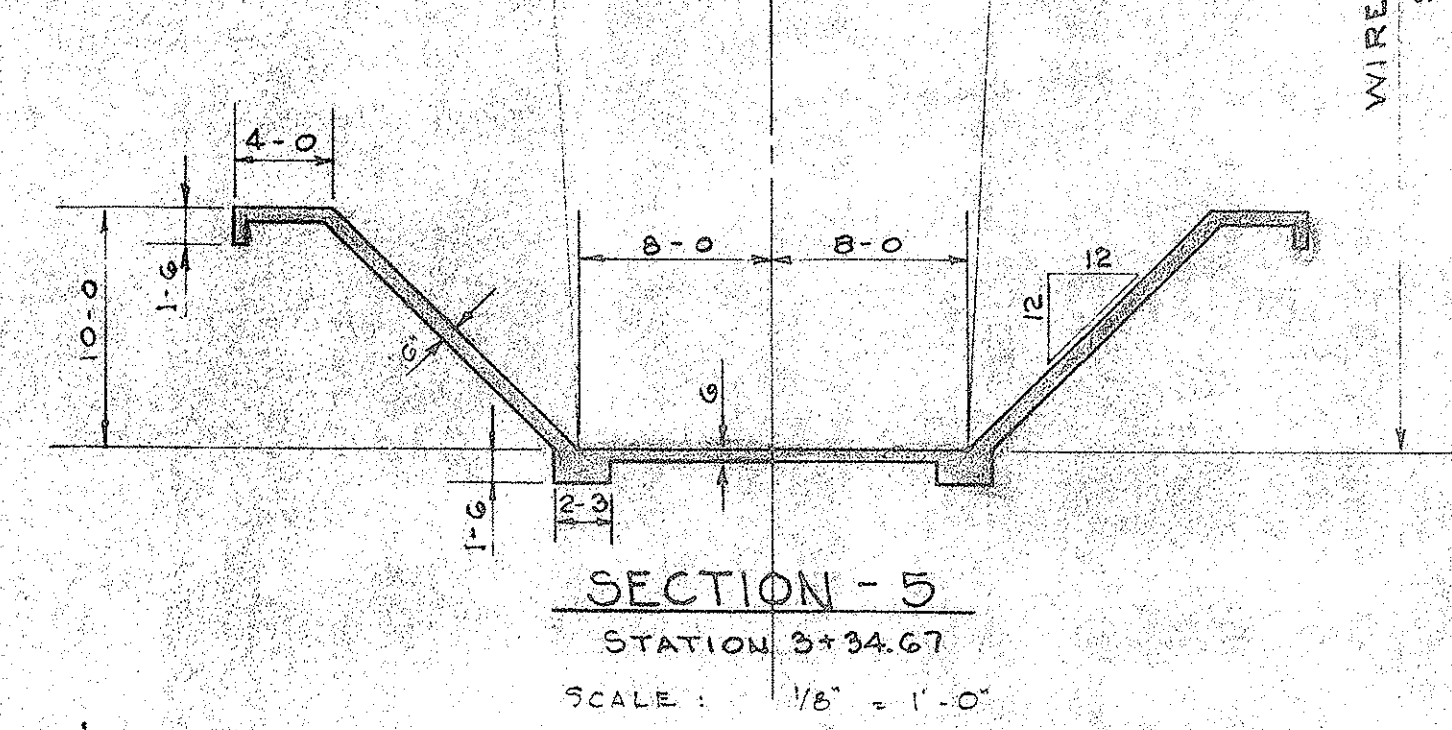
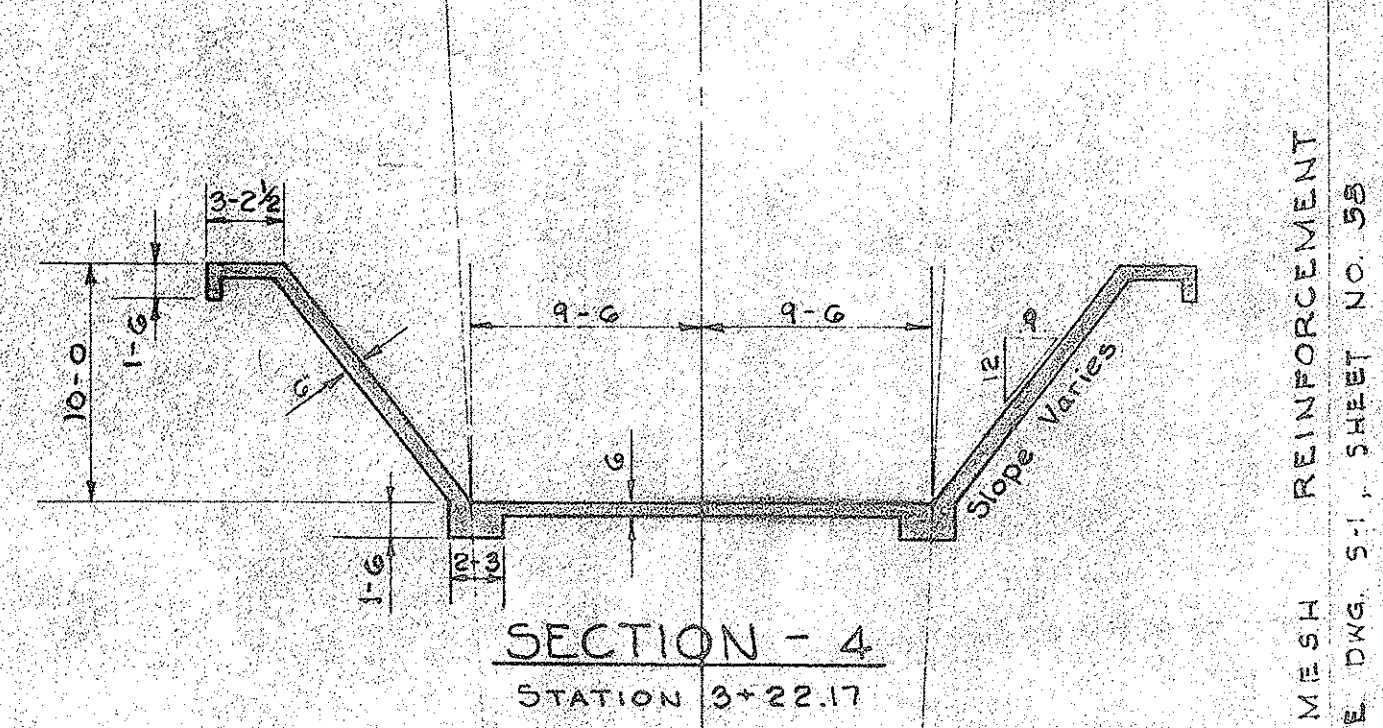
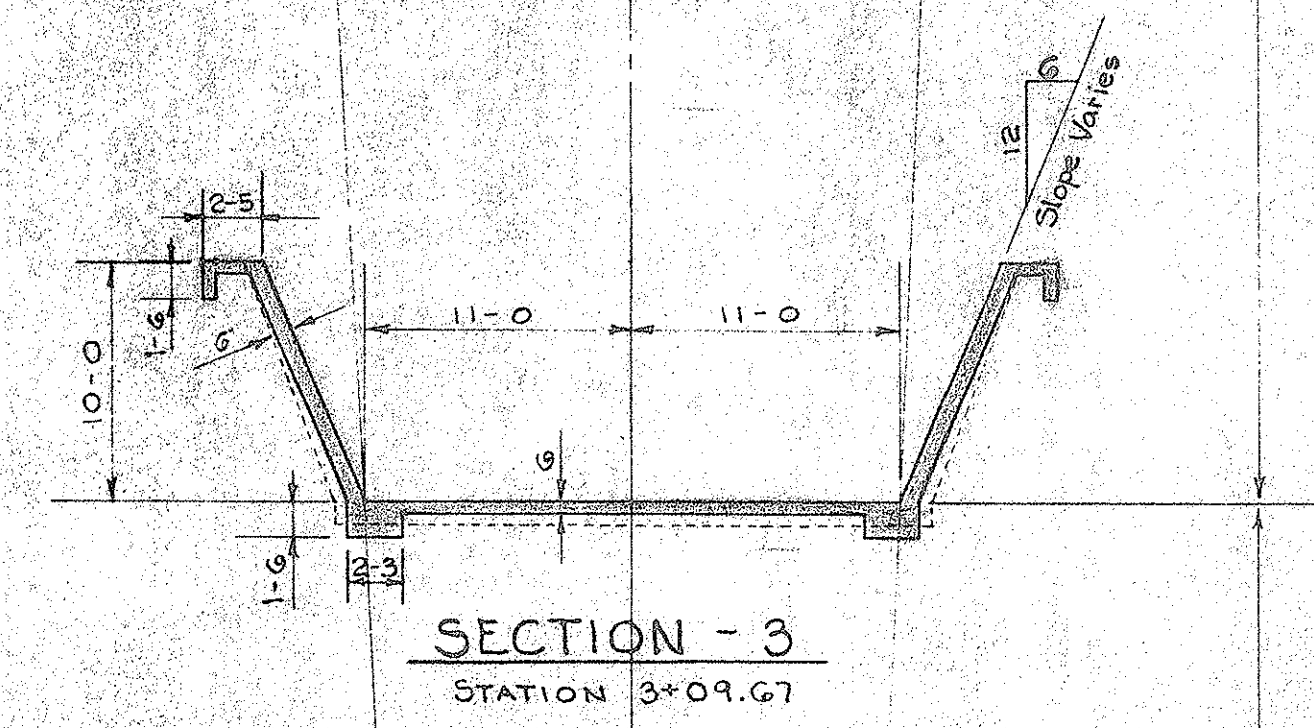
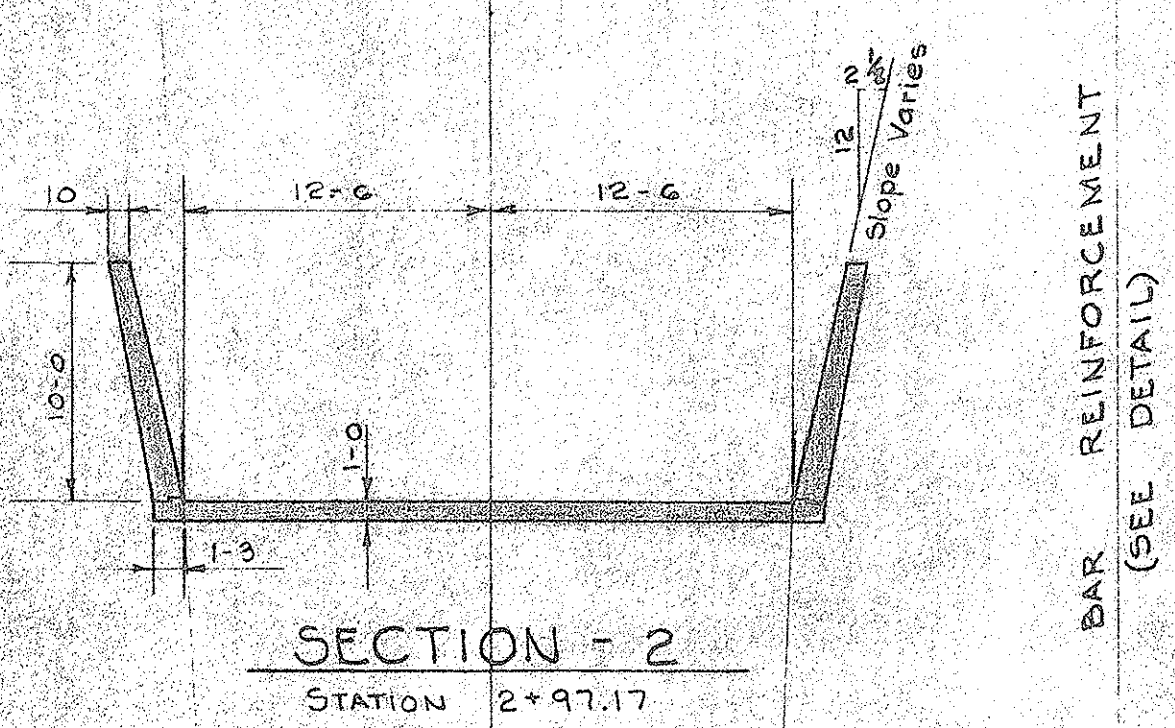
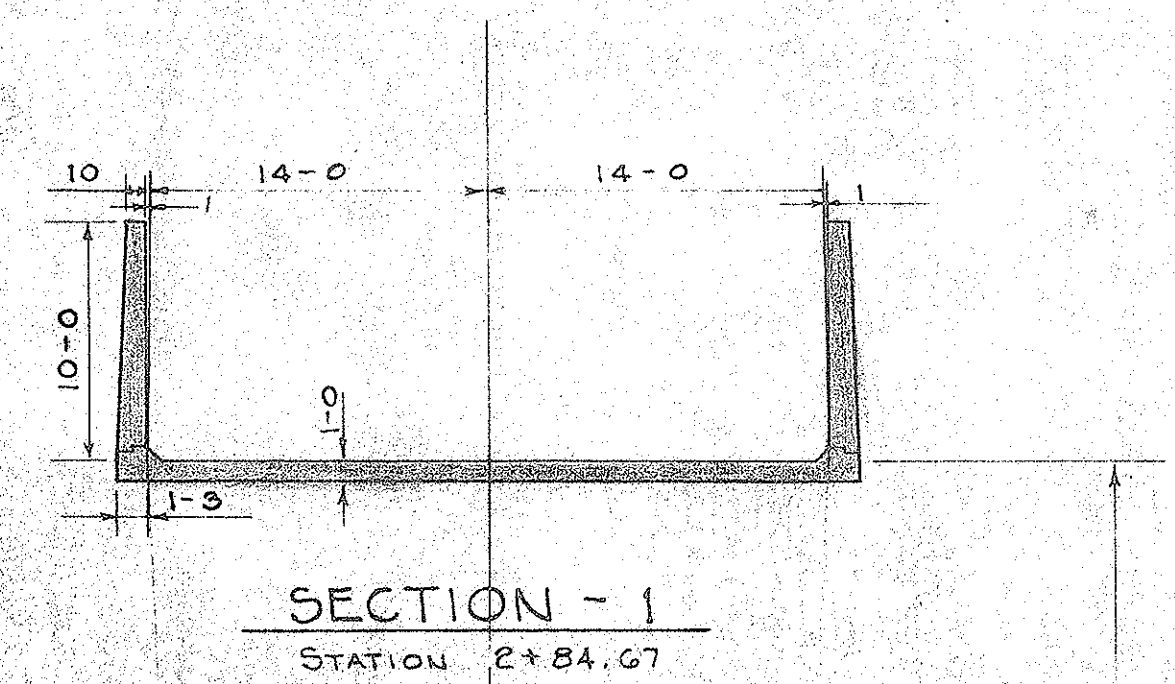
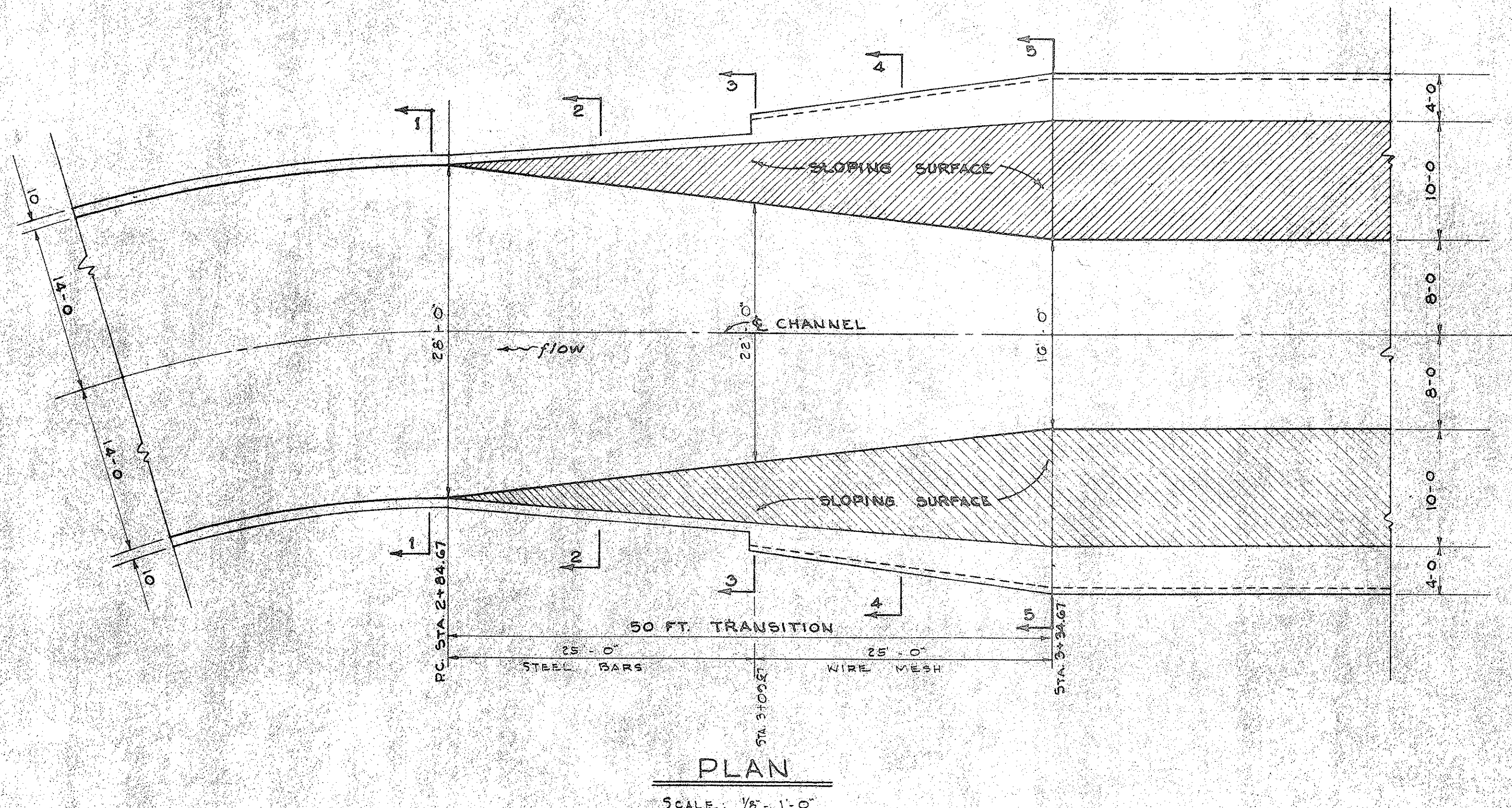
\*4" Conc. Pipe Weepers and Crushed Rock Filter Material shall not be paid for separately, but shall be incidental to Proposal Item No. 2-E-1 Class "B-1" concrete.

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL  
STREAM DIVERSION  
INTERSECTION DETAILS  
CURVE 1 & SPUR 5**

ENGINEER: J.C.M. - J.S.S.Y. DATE: JULY 15, 1953  
DRAFTSMAN: J.S.S.Y. CHECKED BY: J.C.M. - R.K.  
SCALE: As Shown TRACER: J.S.  
APPROVED: *[Signature]* APPROVED: *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

SECTION C JOB NO. 26-53 DWG. S-5





BAR REINFORCEMENT (SEE DETAIL)

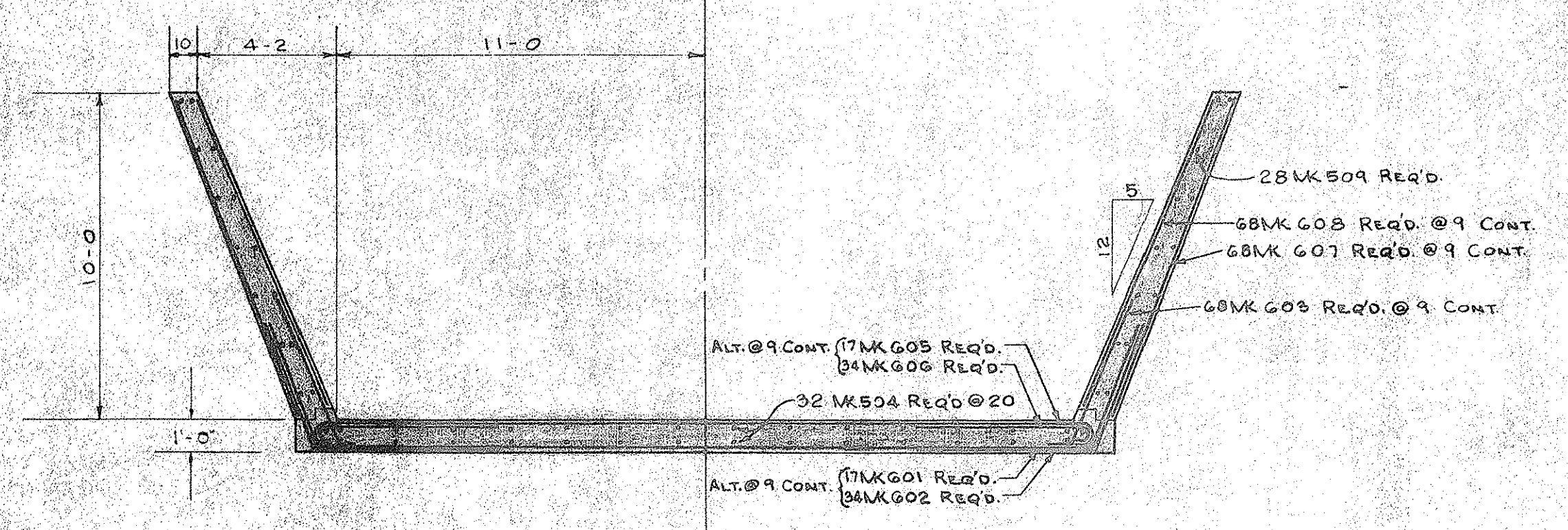
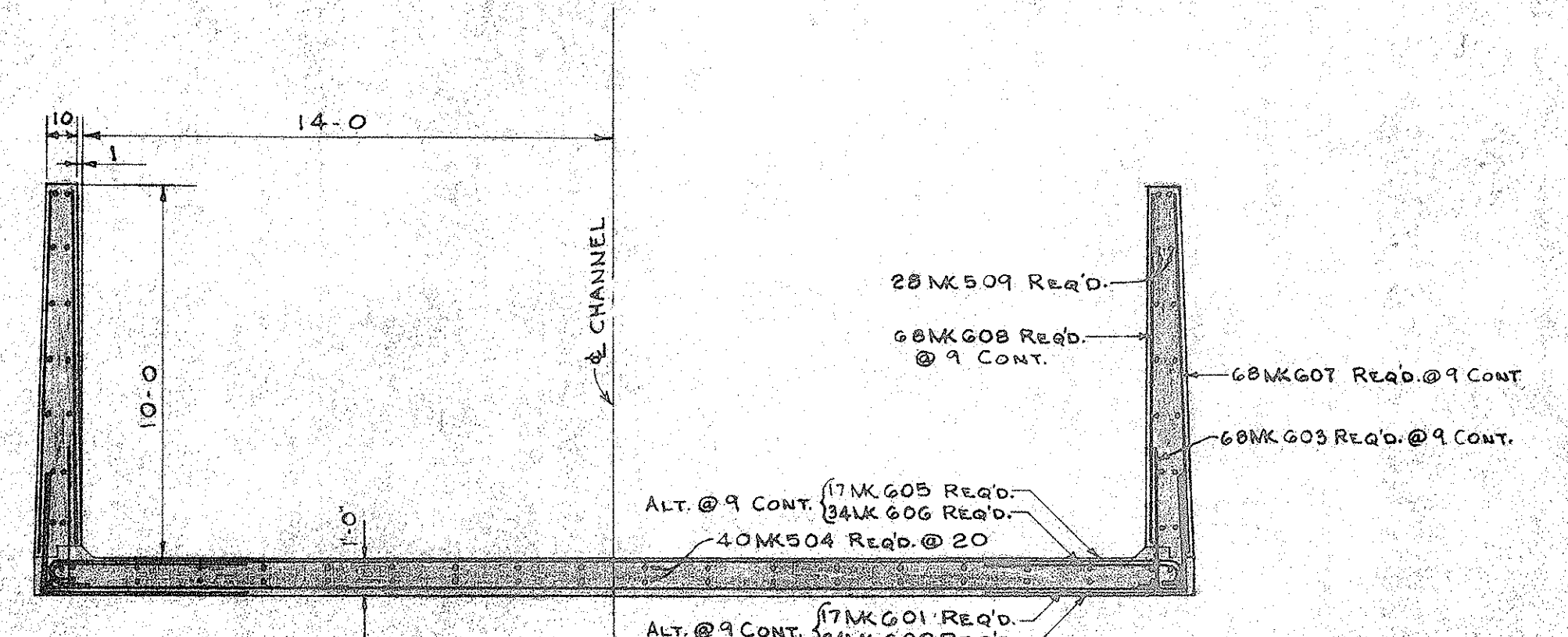
WIRE MESH REINFORCEMENT (SEE DNG. S-1, SHEET NO. 5B)

**REINFORCING BAR SCHEDULE**

BENDING DIAGRAMS All dimensions out to out	MARK	NO.	SIZE	LENGTH	REMARKS
Slope Varies					
Varies from 30-2 to 24-2					
MK G01					
5-0					
MK G02					
3-9					
MK G03					
5-0					
MK G05					
5-0					
MK G06					
Additional Bars, Used with Wire Reinforcement					

**ESTIMATE OF QUANTITIES FOR 50 FT. TRANSITION**

CONCRETE: 79.5 CUBIC YARDS  
STEEL: 6638 POUNDS  
WIRE FABRIC: 651 POUNDS, (15% added for lapping)



**STEEL BARS REINFORCEMENT DETAILS**  
SCALE: 1/4" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHI TUNNEL**  
**STREAM DIVERSION**  
**TRANSITION DETAILS**  
**STA. 2+84.67 TO 3+34.67**

ENGINEER: J.C.M. DATE: JUL 18, 1952  
DRAFTSMAN: J.E.S. CHECKED BY: J.C.M./R.K.  
SCALE: AS SHOWN TRACER: J.E.S.  
APPROVED: *J. J. J.* APPROVED: *H. J. J.*  
CHIEF ENGINEER BUREAU ENGINEER

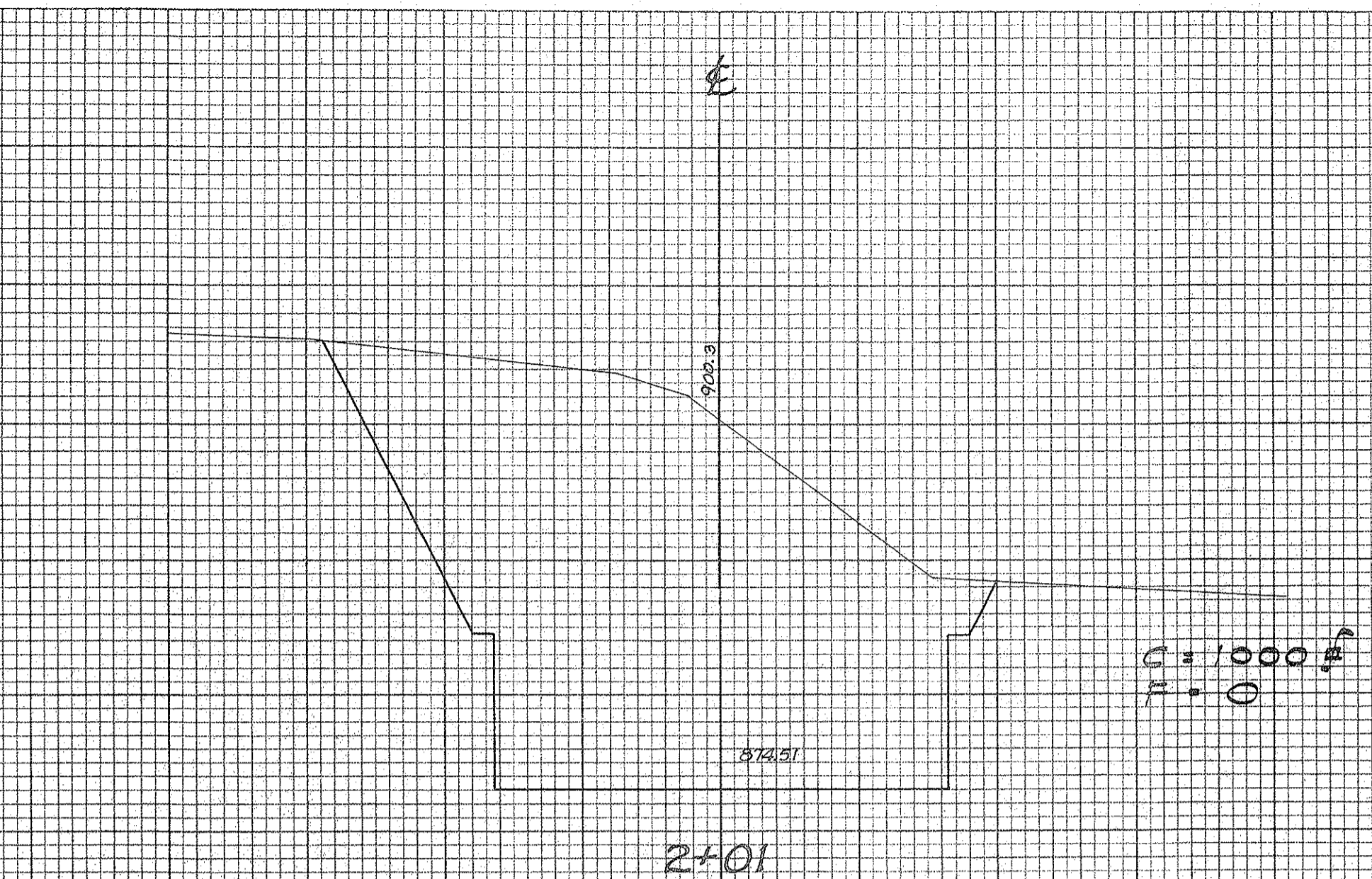
APPROVED  
*J. J. J.*  
ENGINEER, KALIHI TUNNEL

FILE	POCKET	FOLDER	NO.
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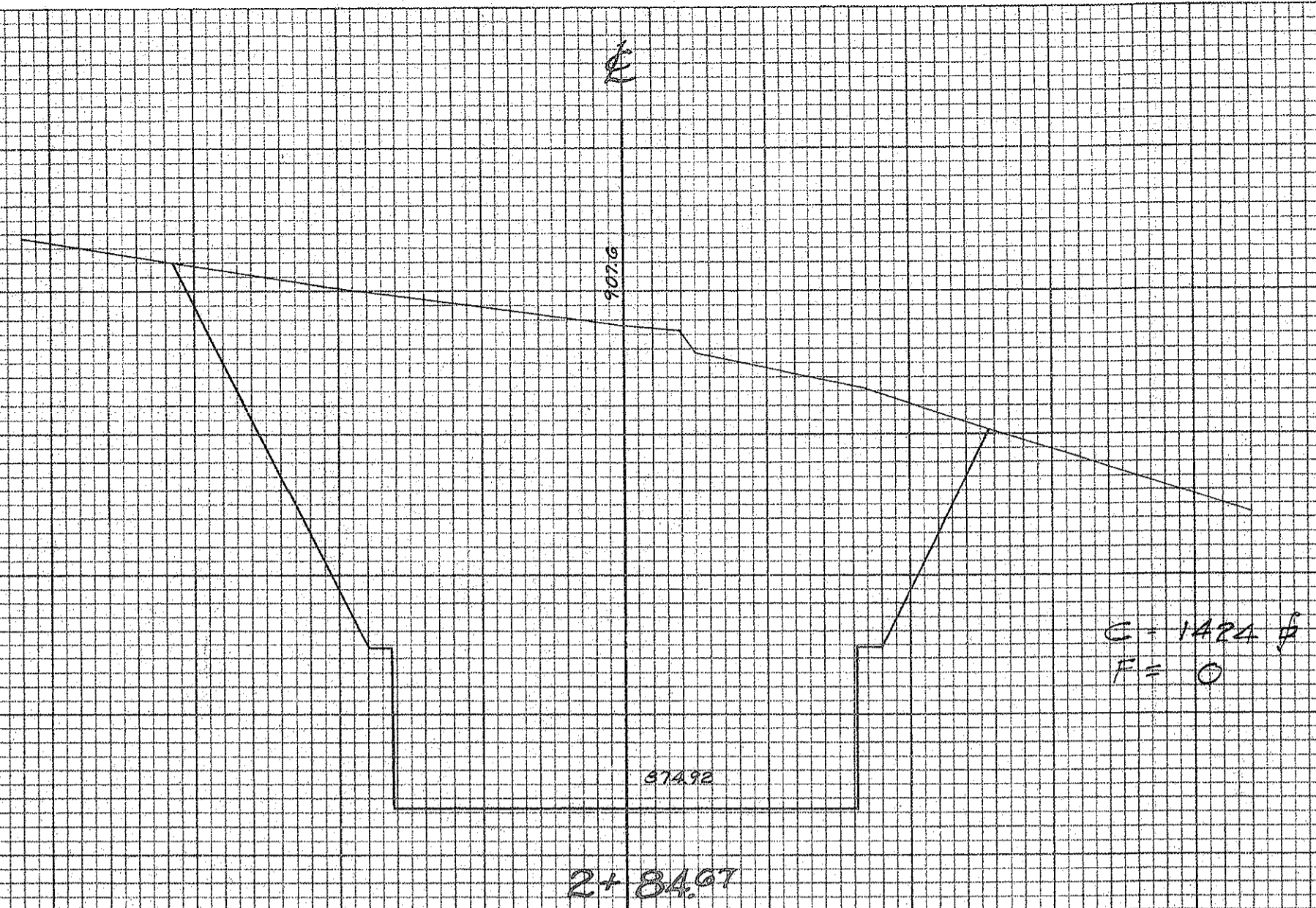


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 SURVEY PLOTTED BY DATE  
 NOTE BOOK NO. AREAS CHECKED.

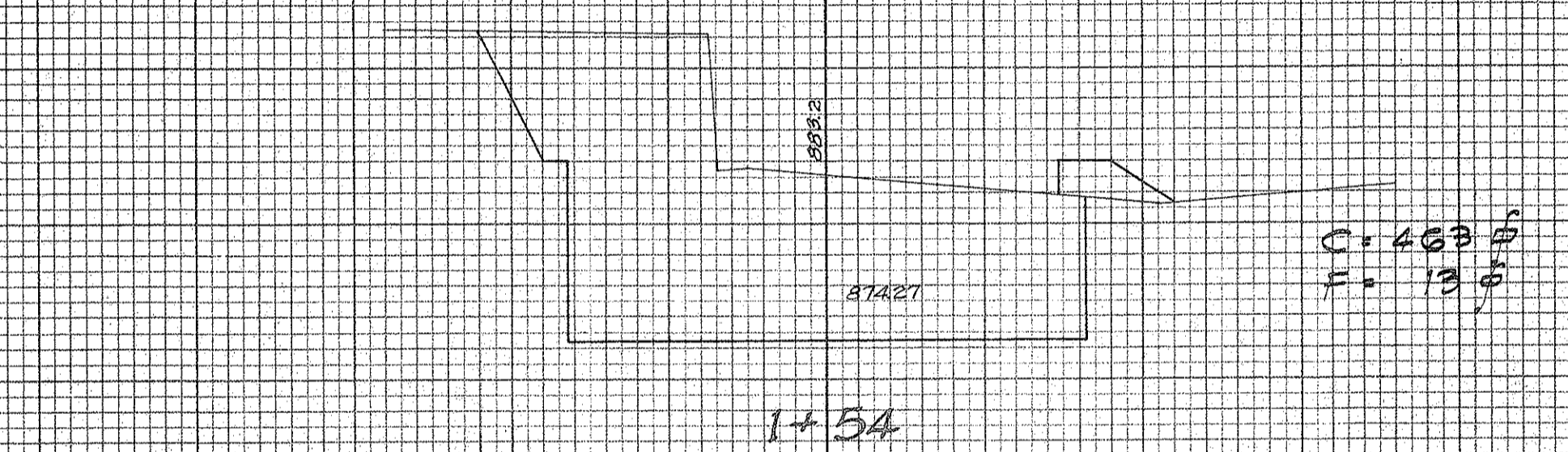
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 SURVEY PLOTTED BY DATE  
 NOTE BOOK NO. AREAS CHECKED.



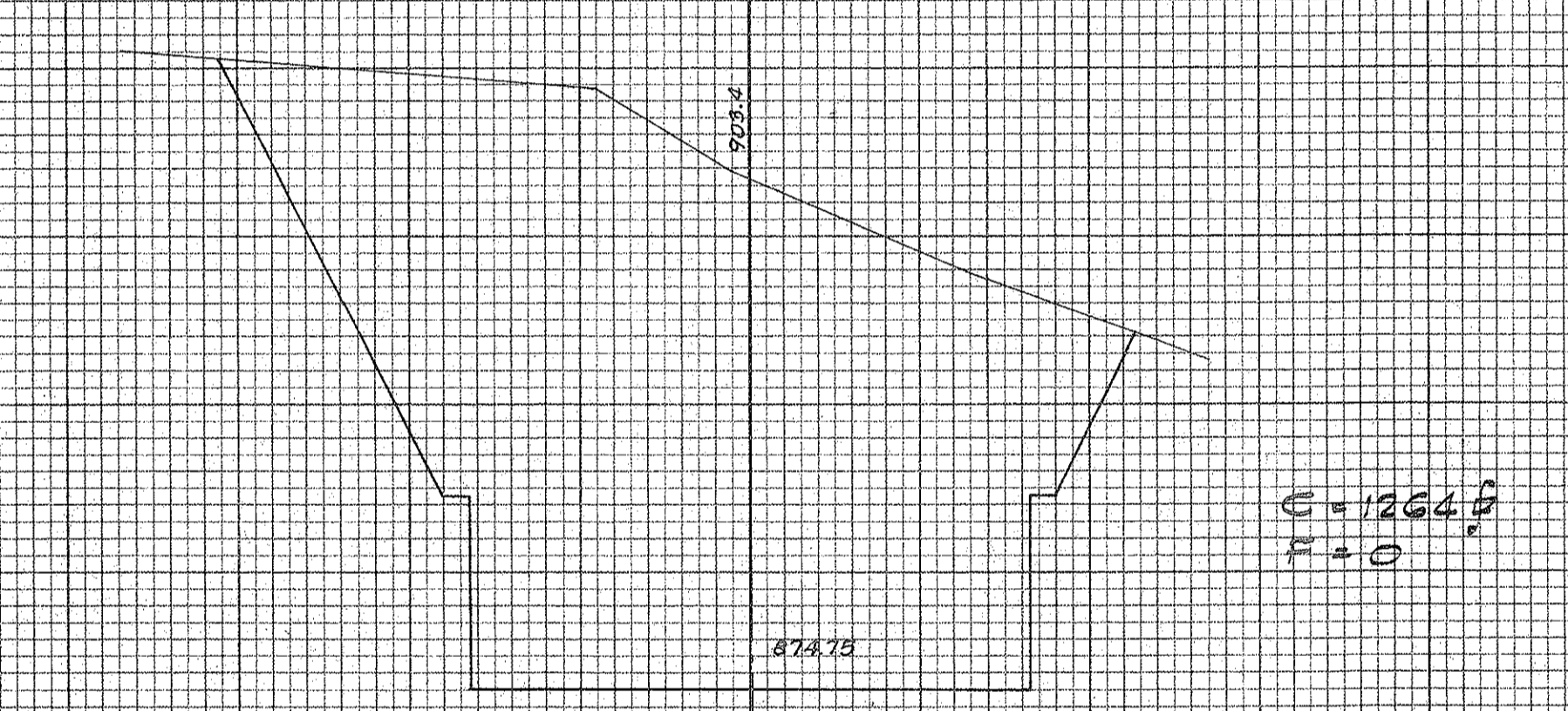
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 Emb = 21 cy



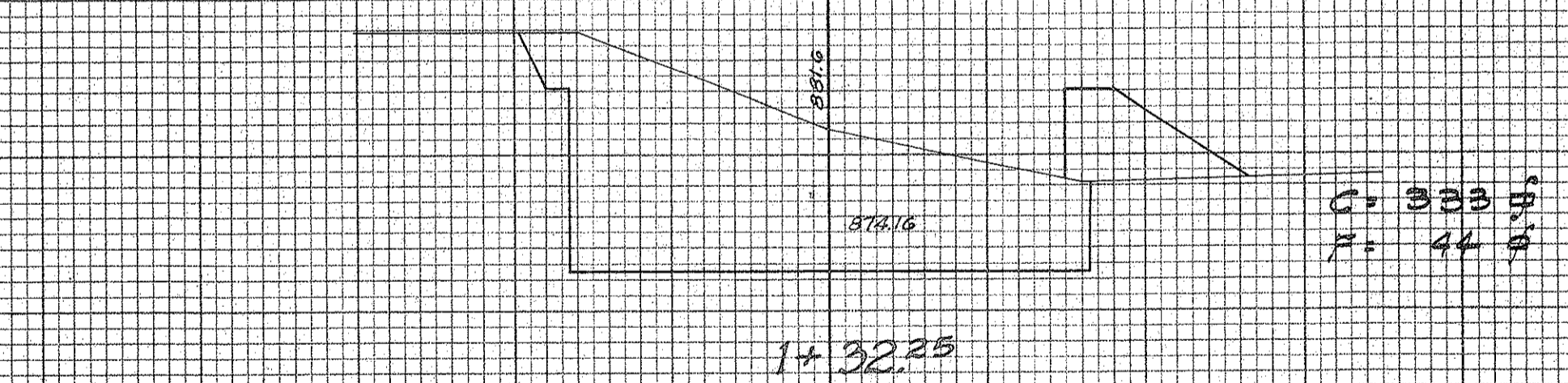
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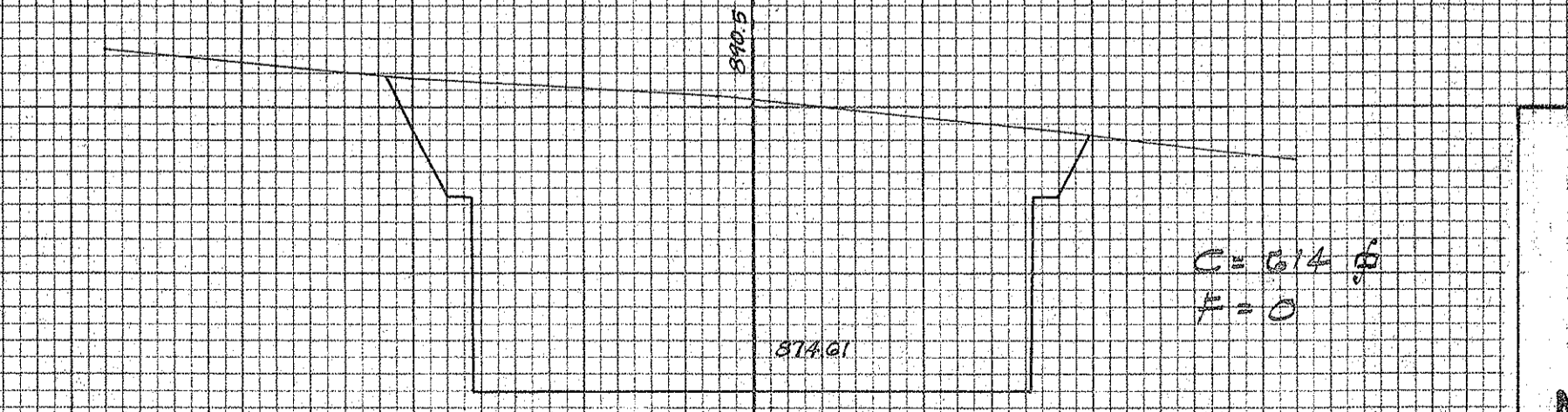
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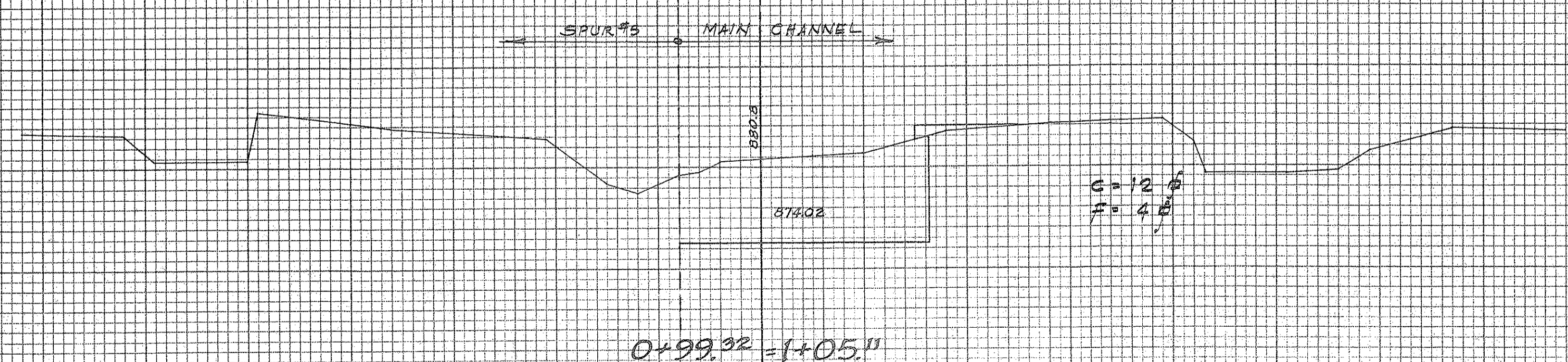
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 Emb = 0



Exc = 176.9 cy  
 Emb = 24.6 cy



Exc = 627.7 cy  
 Emb = 0



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 MAIN CHANNEL CROSS SECTIONS

ENGINEER: S.O.H. - J.S.B.Y. DATE: JULY 16, 1983  
 DRAFTSMAN: J.S. CHECKED BY: S.O.H. - R.W.  
 SCALE: Vert. 1" = 4' Hor. 1" = 10' TRACER: J.S.  
 APPROVED: *S.O.H.* CHIEF ENGINEER APPROVED: *H.W. B. Antzorn* BUREAU ENGINEER

APPROVED  
*S.O.H.*  
 ENGINEER, KALIHI TUNNEL

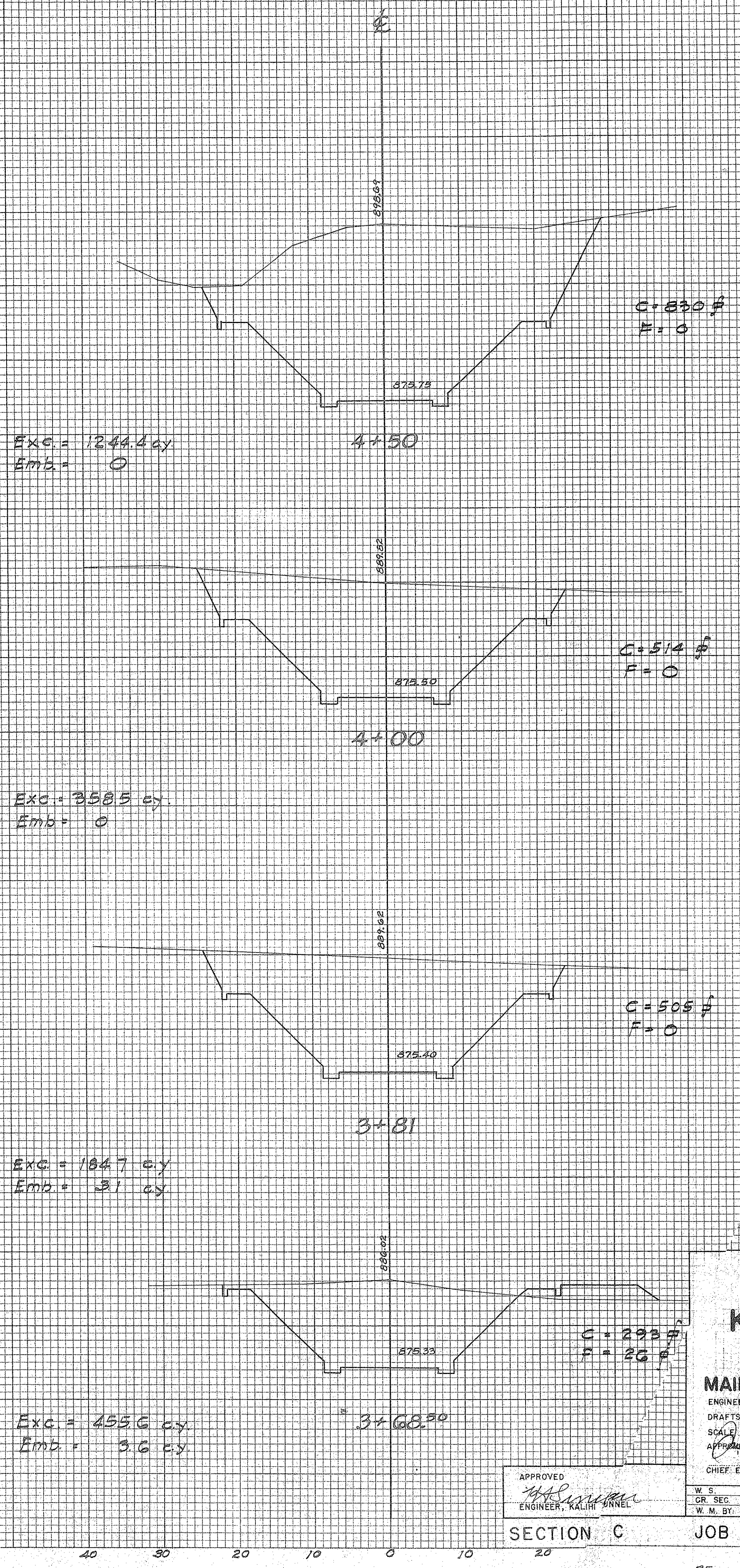
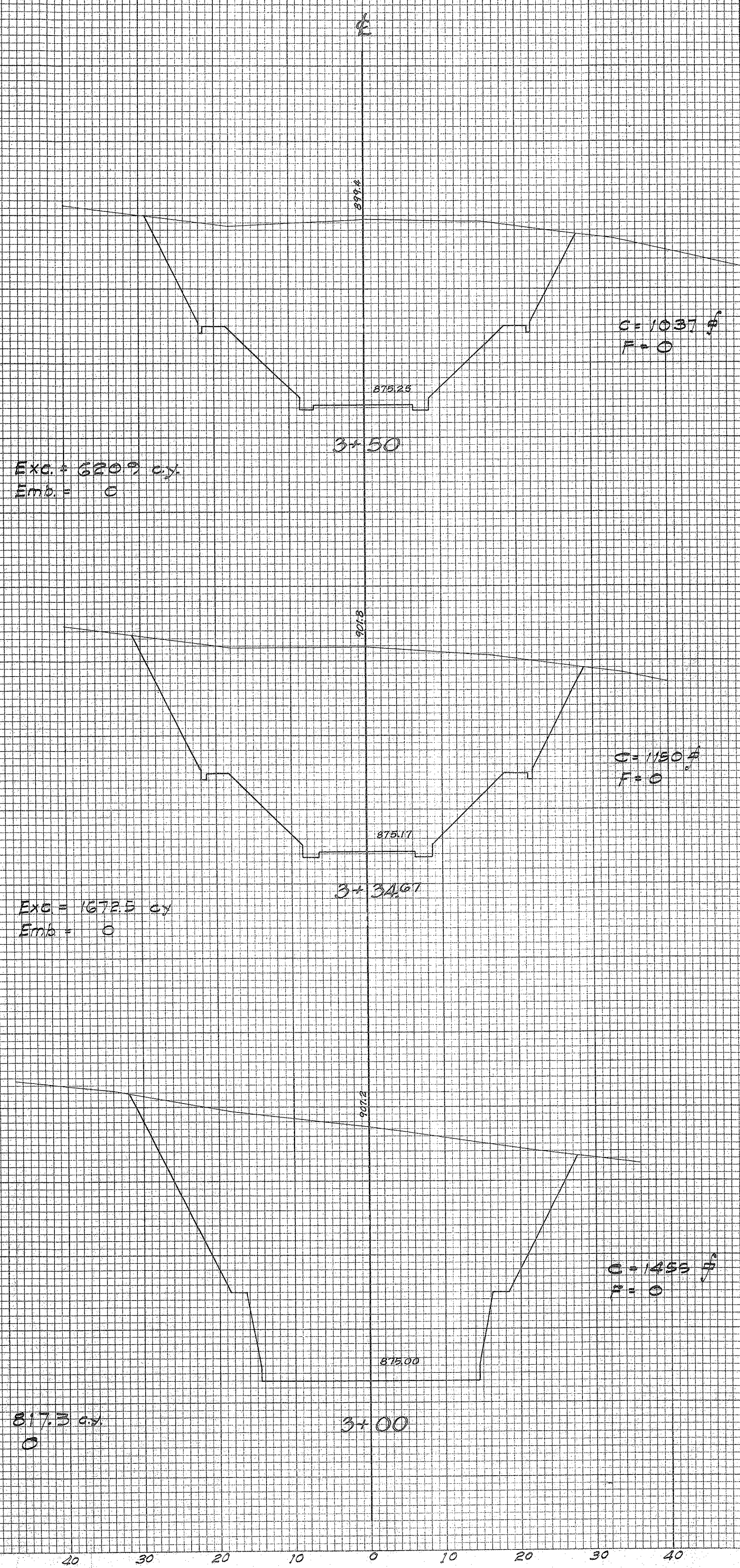
SECTION C JOB NO. 26 - 53 DWG. S-7

FILE	POCKET	FOLDER	NO.
7	5	2	27



FINAL SURVEY  
 SURVEYED  
 PLOTTED  
 NOTE BOOK  
 AREAS CHECKED

ORIGINAL SURVEY  
 SURVEYED  
 PLOTTED  
 NOTE BOOK  
 AREAS CHECKED



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 MAIN CHANNEL CROSS SECTIONS  
 ENGINEER: J. S. ... DATE: JULY 18, 1963  
 DRAFTSMAN: J. S. ... CHECKED BY: J. S. ...  
 SCALE: 1/2" = 1' ... TRACER: J. S. ...  
 APPROVED: *J. S. ...* H. W. Butzner  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*[Signature]*  
 ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY:	F. W. BY:	S. BY:

SECTION C JOB NO. 26 - 53 DWG. S-8

FILE	POCKET	FOLDER	NO.
7	5	2	28



FINAL SURVEY  
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 PLOTTED BY  
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 PLOTTED BY  
 NOTE BOOK NO.  
 TEMPLATE AREAS CHECKED

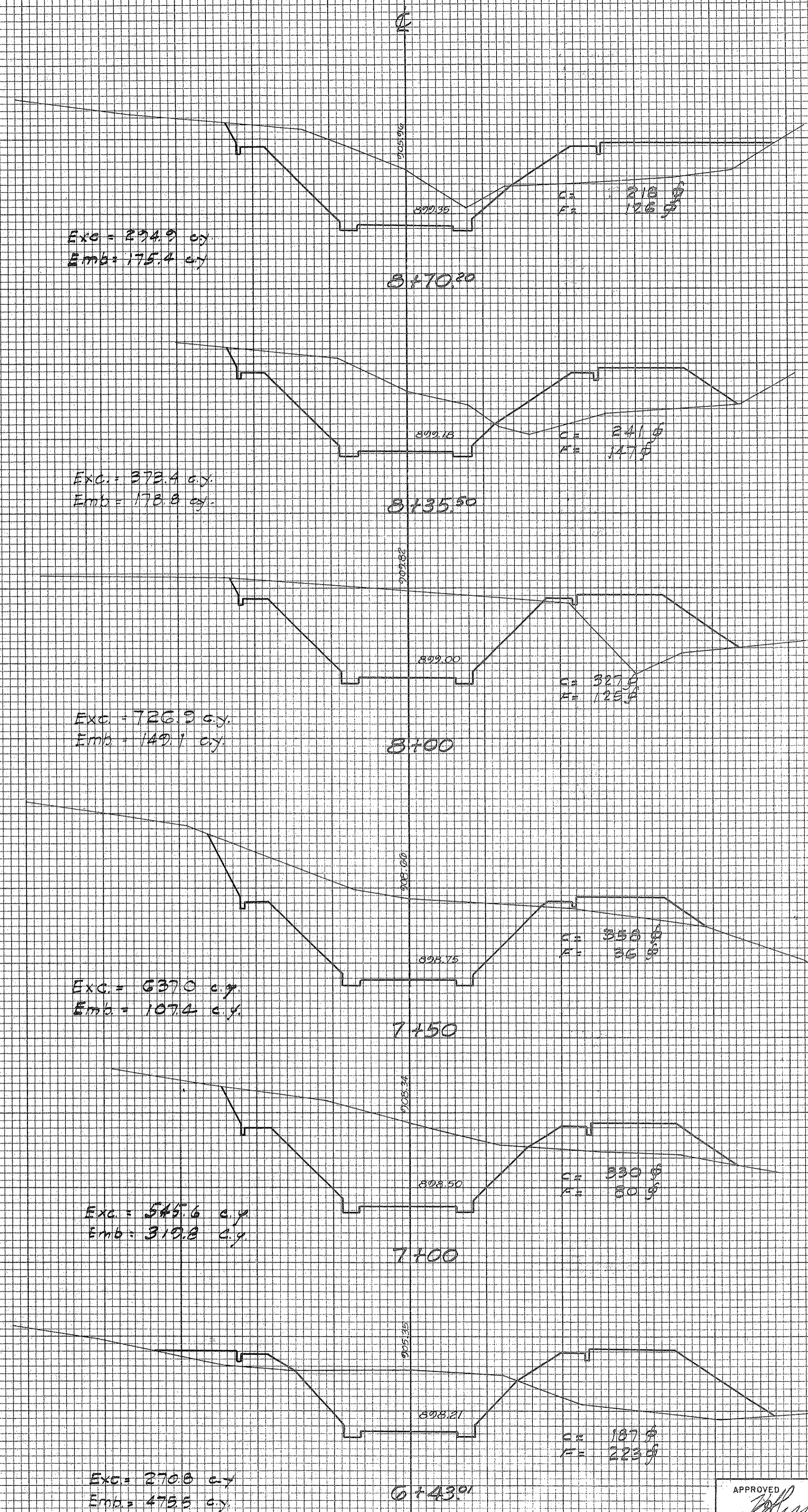
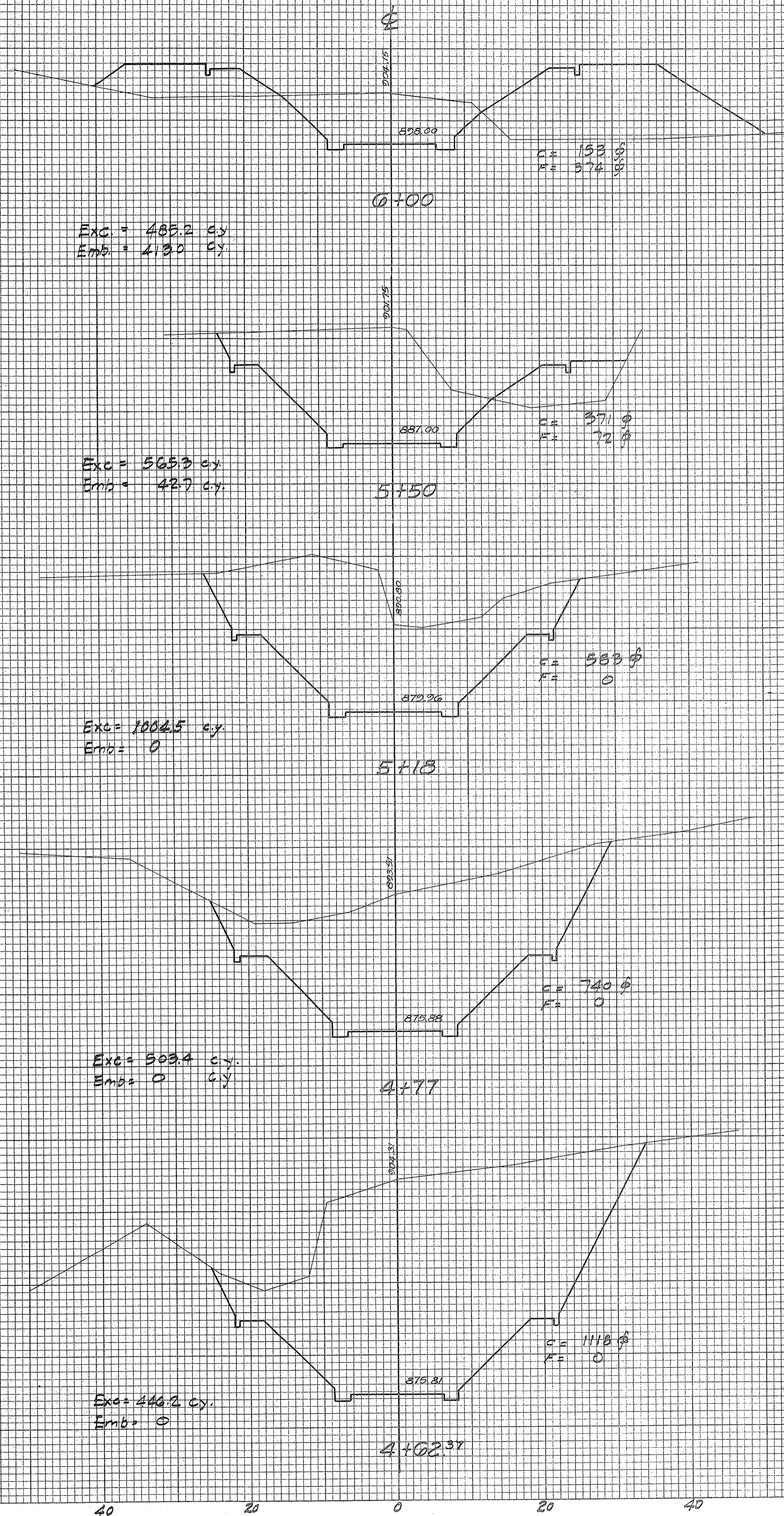


PLATE 3 - CROSS SECTION O. P. R. & R. STANDARD  
 KEUFFEL & ESSER CO., NEW YORK

APPROVED  
 ENGINEER, KALIHI TUNNEL

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 MAIN CHANNEL CROSS SECTIONS  
 ENGINEER: S.O.H. S.E.Y.  
 DRAFTSMAN: J.S.  
 SCALE: Vert. 1" = 10', Hor. 1" = 10'  
 APPROVED: [Signature]  
 CHIEF ENGINEER  
 DATE: JULY 18, 1963  
 CHECKED BY: S.O.H. S.E.Y.  
 TRACER: J.S.  
 APPROVED: [Signature]  
 BUREAU ENGINEER

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

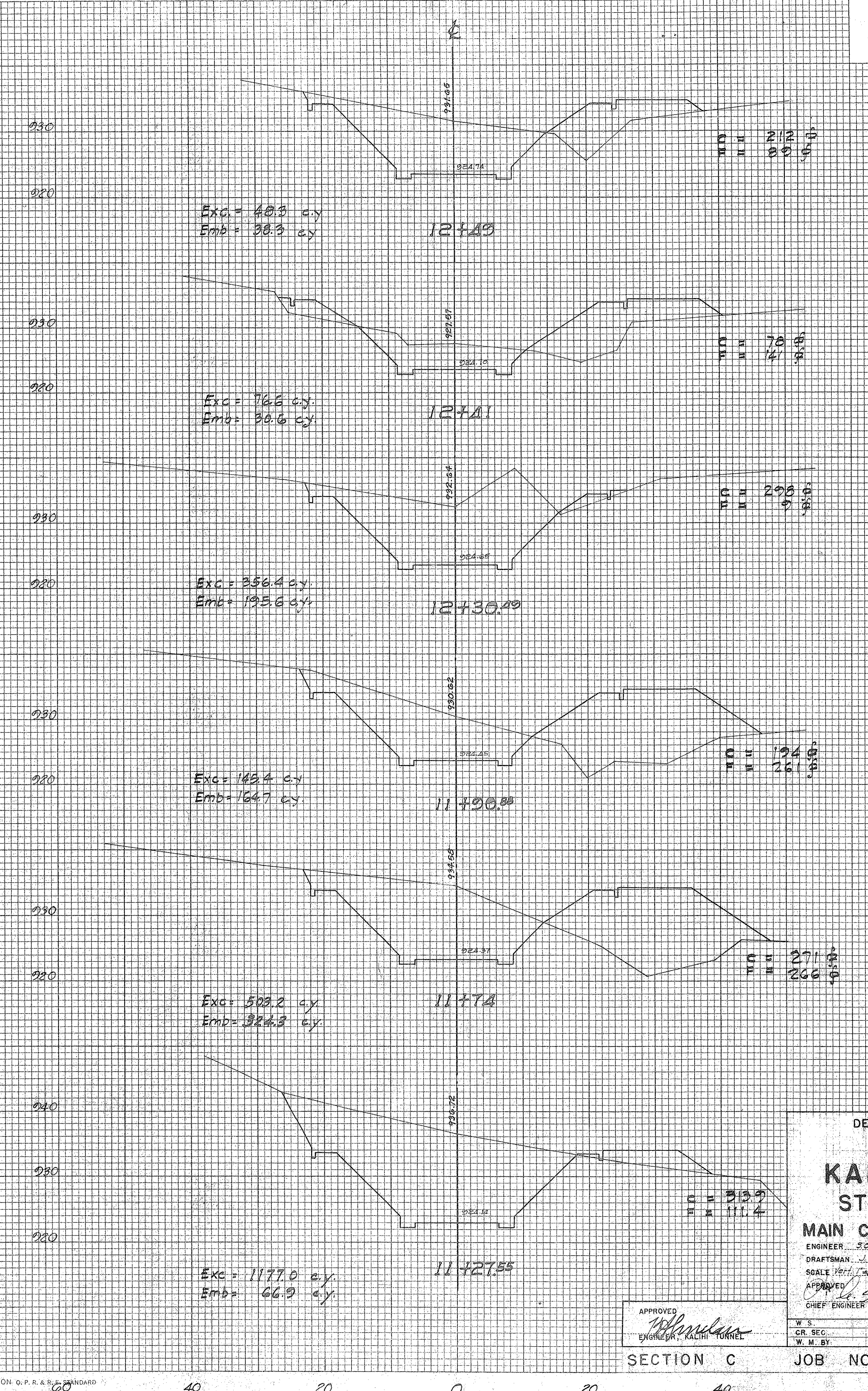
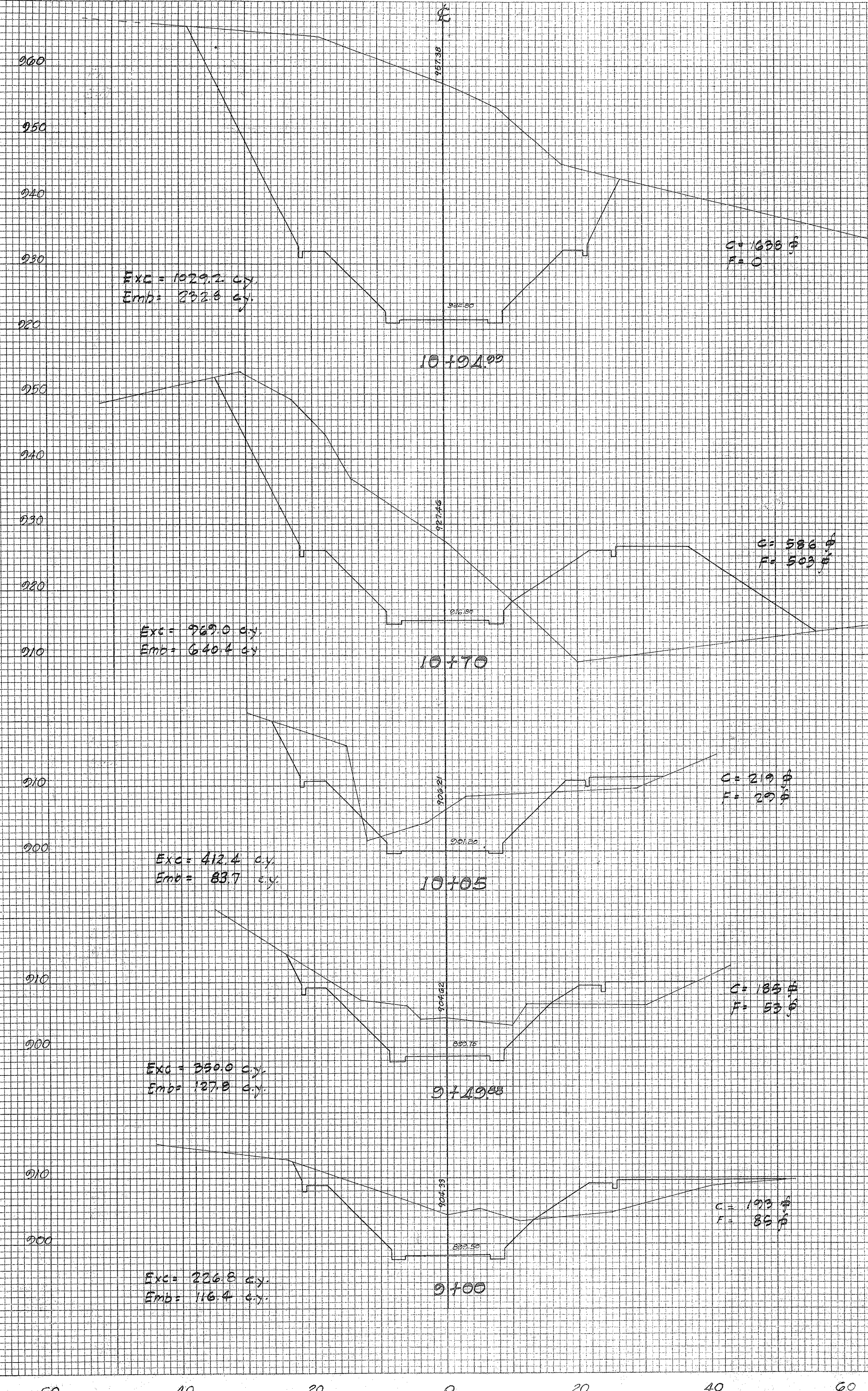
Sheet No. 66 of 252 Sheets

FILE	POCKET	FOLDER	NO.
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FINAL SURVEY BY DATE  
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 NOTE BOOK TEMPLATE AREAS CHECKED  
 NO.

ORIGINAL SURVEY BY DATE  
 SURVEYED PLOTTED  
 NOTE BOOK TEMPLATE AREAS CHECKED  
 NO.



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 MAIN CHANNEL CROSS SECTIONS

ENGINEER: S.C.H. L.S.B. DATE: July 16, 1953  
 DRAFTSMAN: J.S. CHECKED BY: S.C.H. L.S.B.  
 SCALE: Vert. 1" = 10' Hor. 1" = 10' TRACED BY: J.S.  
 APPROVED: *S. C. Hammett* CHIEF ENGINEER APPROVED: *W. M. By* BUREAU ENGINEER

APPROVED: *[Signature]*  
 EXHIBIT, KALIHI TUNNEL

W.S.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M.B.Y.	F.W.B.Y.	S.B.Y.

SECTION C JOB NO. 26 - 53 DWG. S-10

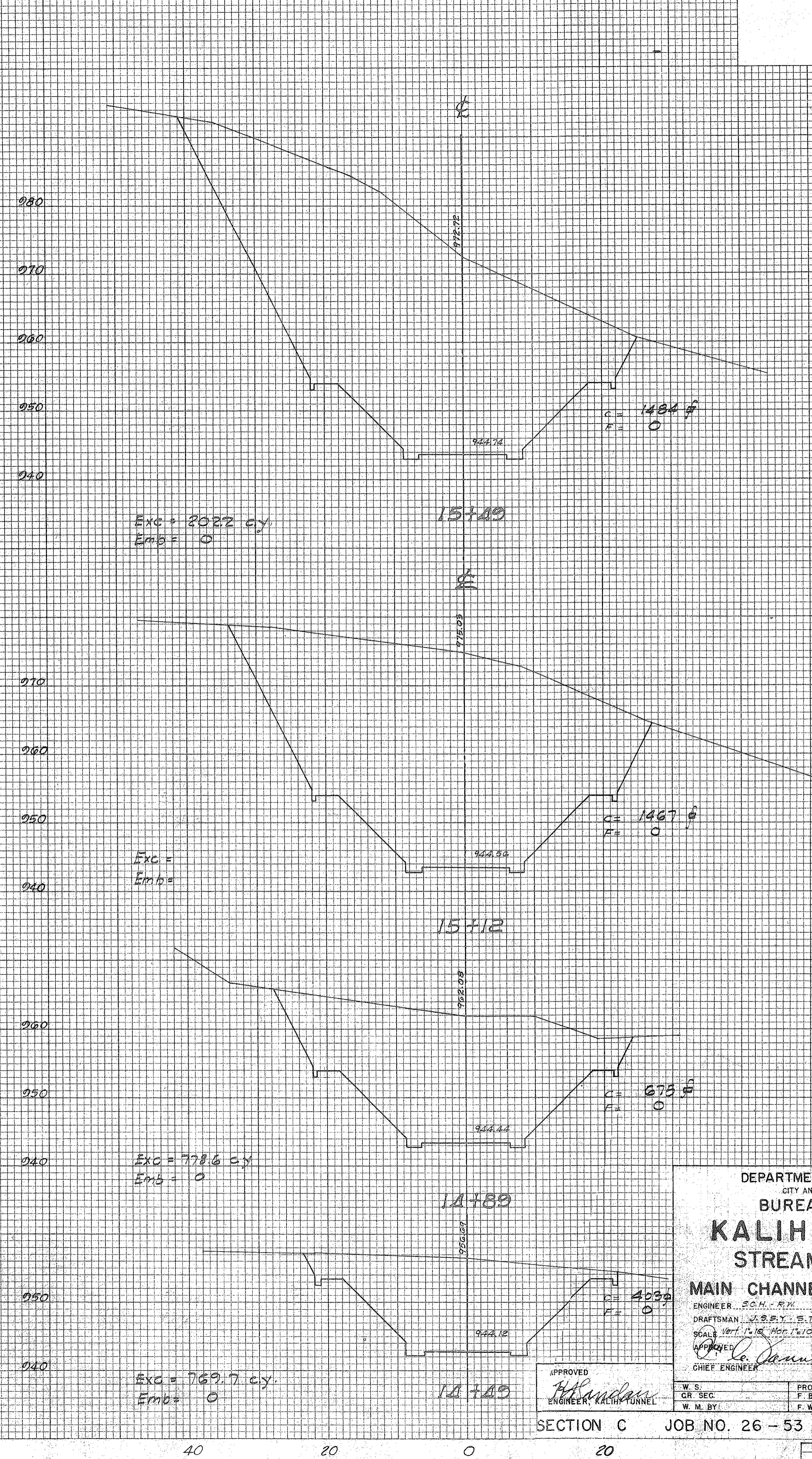
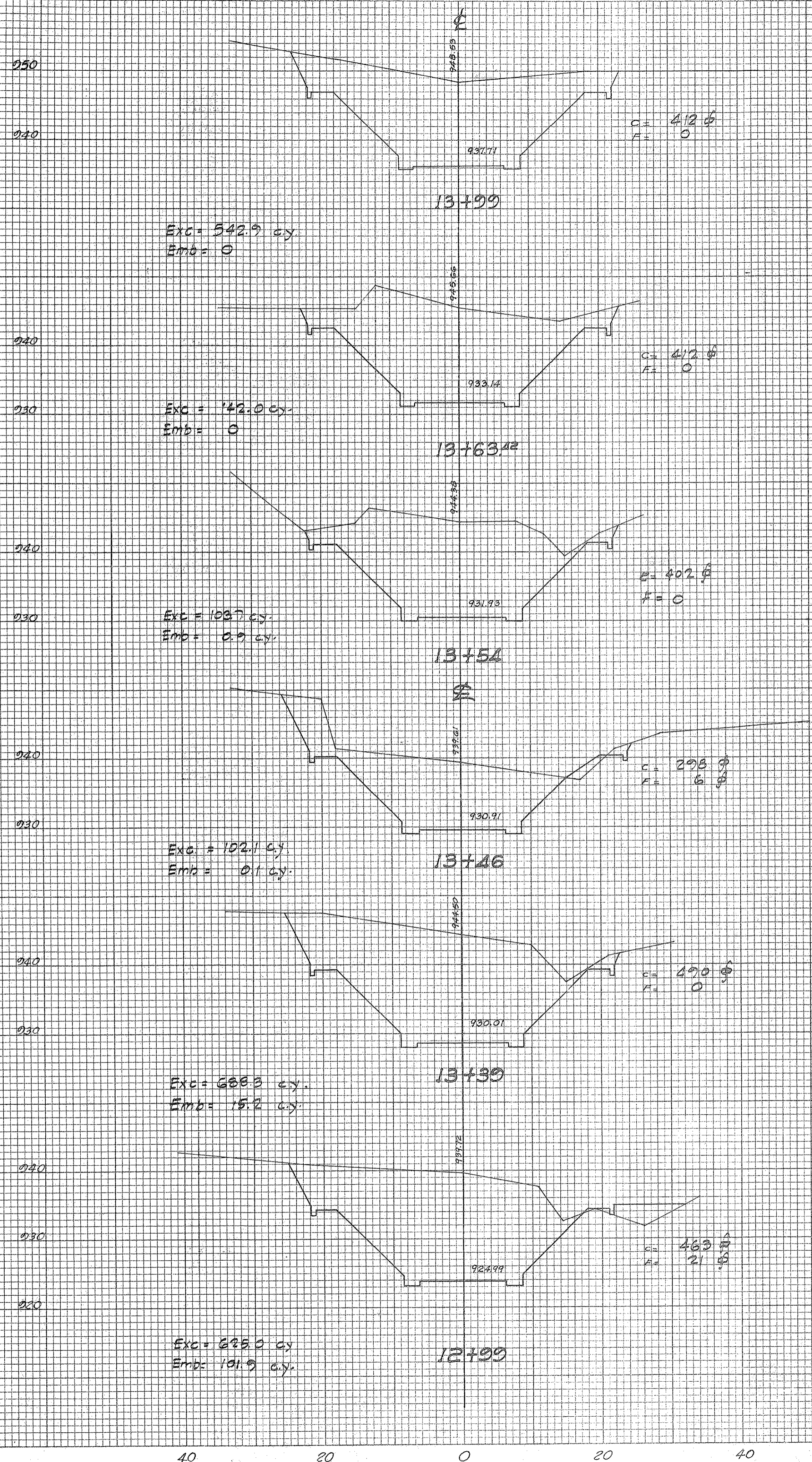
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7	5	2	30

Sheet No. 57 of 252 Sheets



FINAL SURVEY NOTE BOOK NO. \_\_\_\_\_  
 SURVEYED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 PLOTTED BY \_\_\_\_\_  
 TEMPLATE NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_

ORIGINAL SURVEY NOTE BOOK NO. \_\_\_\_\_  
 SURVEYED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 PLOTTED BY \_\_\_\_\_  
 TEMPLATE NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 MAIN CHANNEL CROSS SECTIONS

ENGINEER: S.M. P.M. DATE: JULY 18, 1933  
 DRAFTSMAN: G.B. S.T. CHECKED BY: S.C.H.-R.W.  
 SCALE: Vert. 1" = 10' Hor. 1" = 10'  
 TRACER: S.T.  
 APPROVED: *Lo. Jannotta* CHIEF ENGINEER  
 APPROVED: *W. J. Butz* BUREAU ENGINEER

APPROVED: *W. J. Butz*  
 ENGINEER, KALIHI TUNNEL

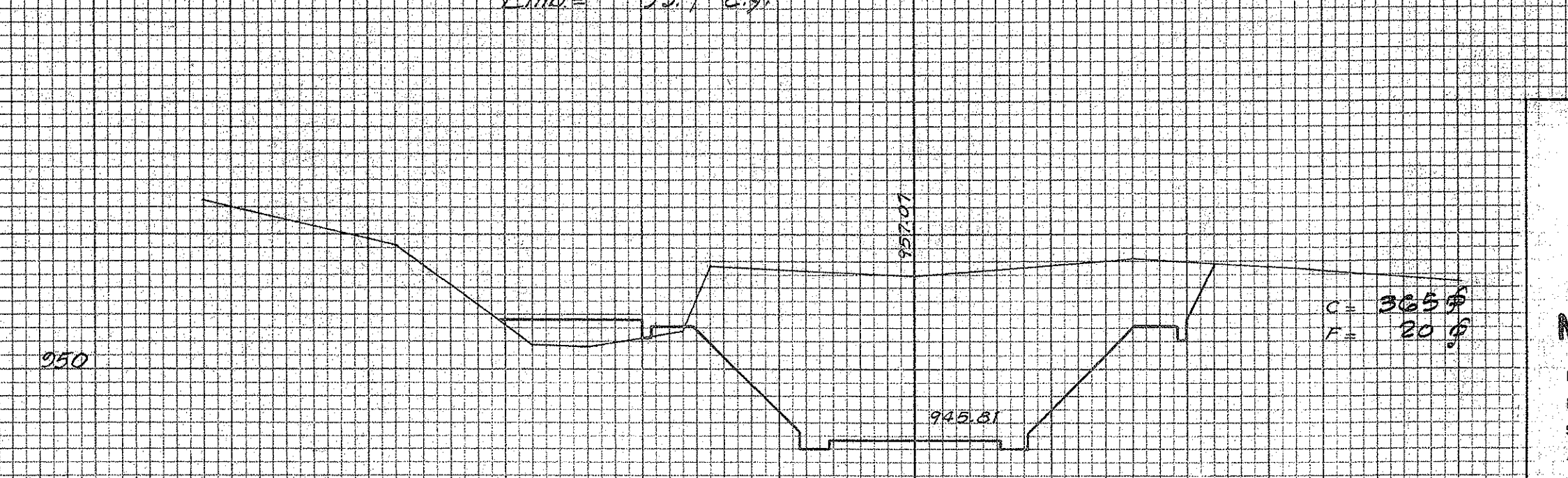
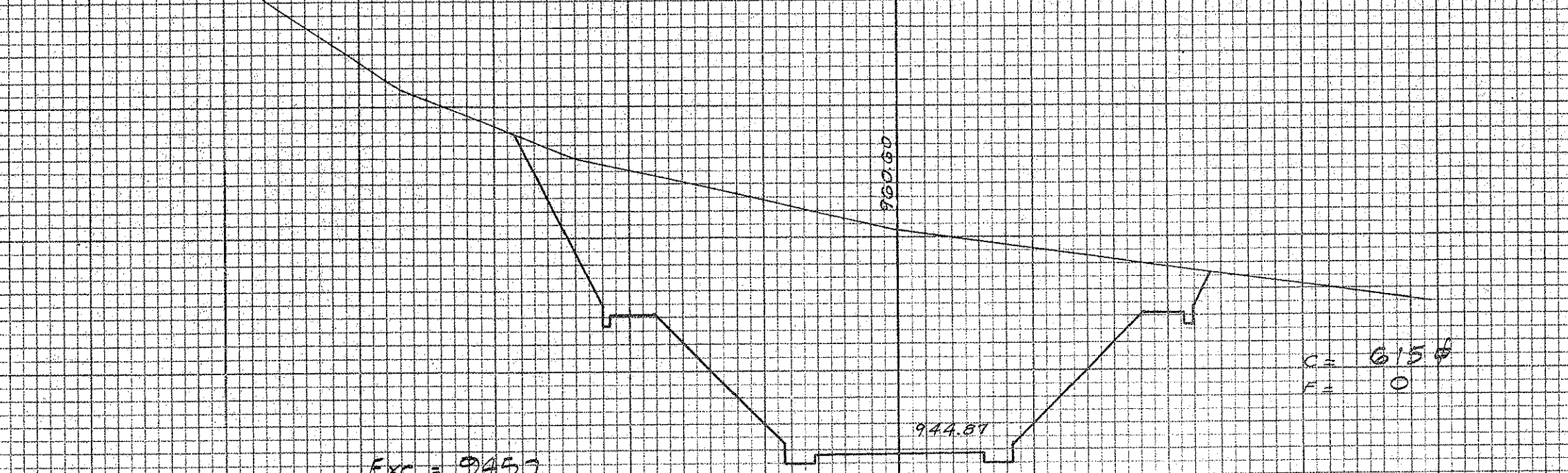
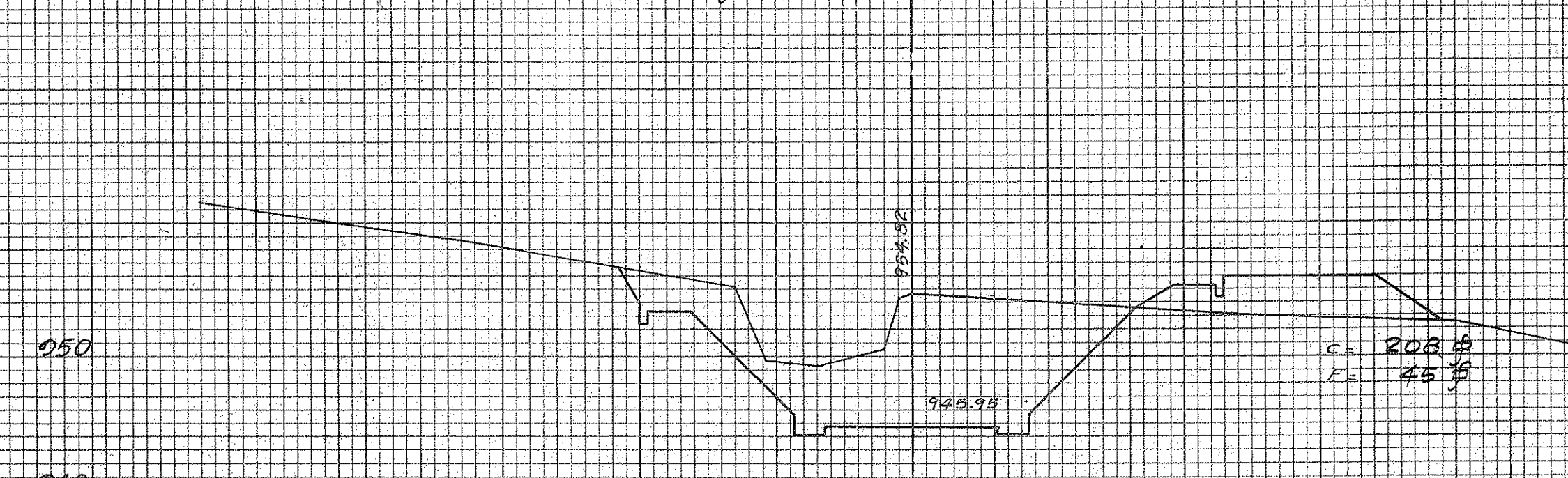
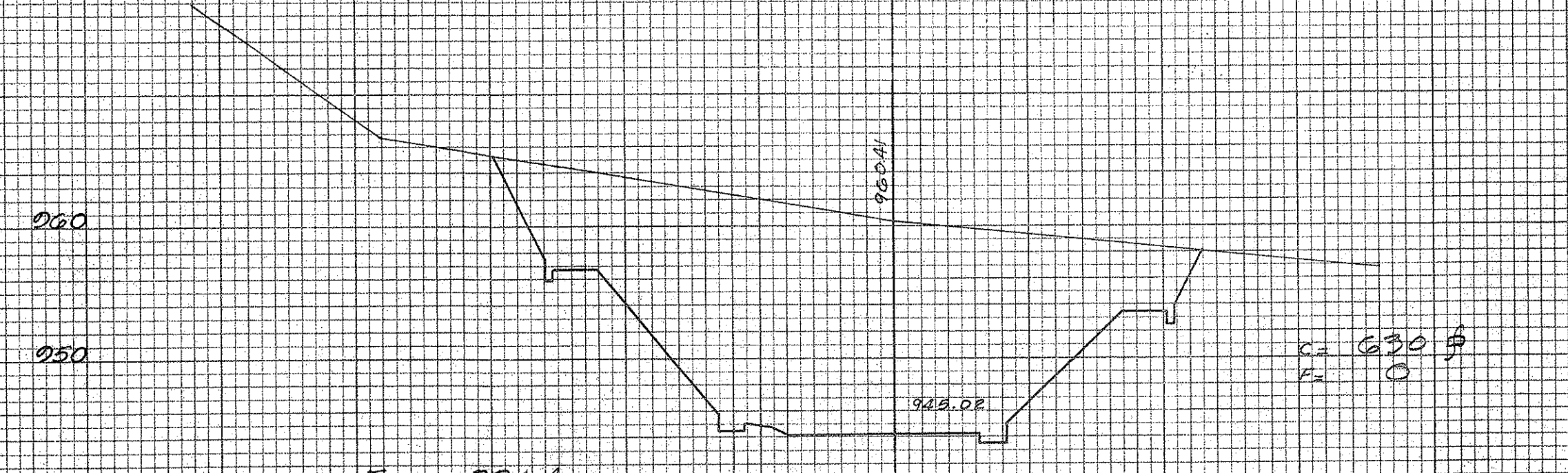
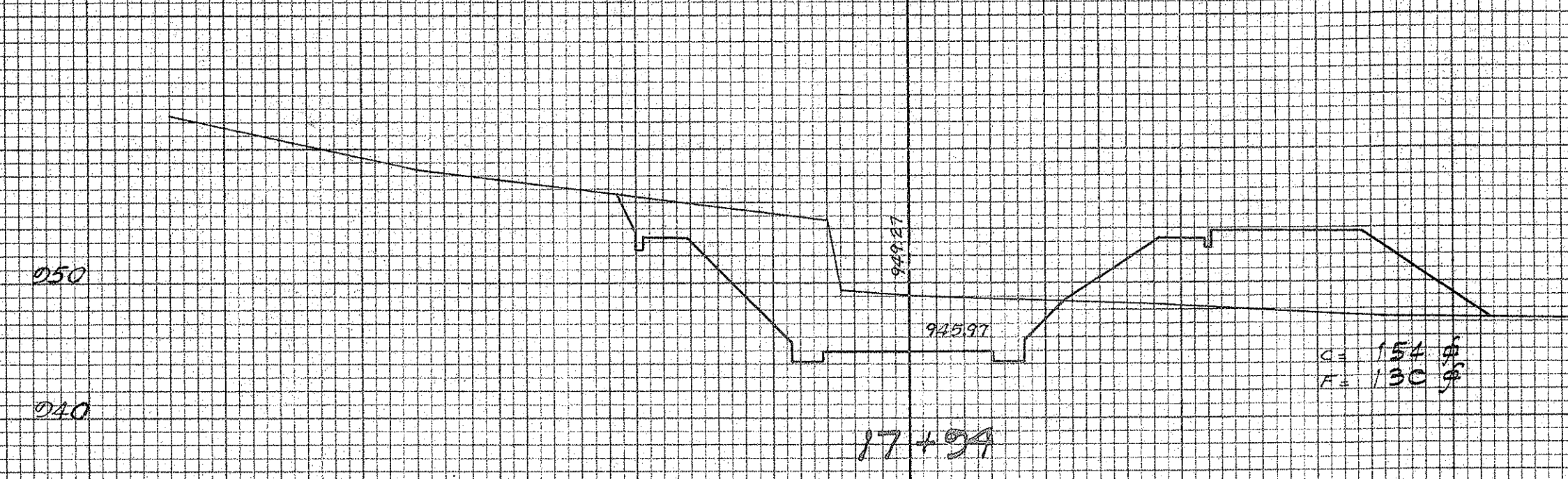
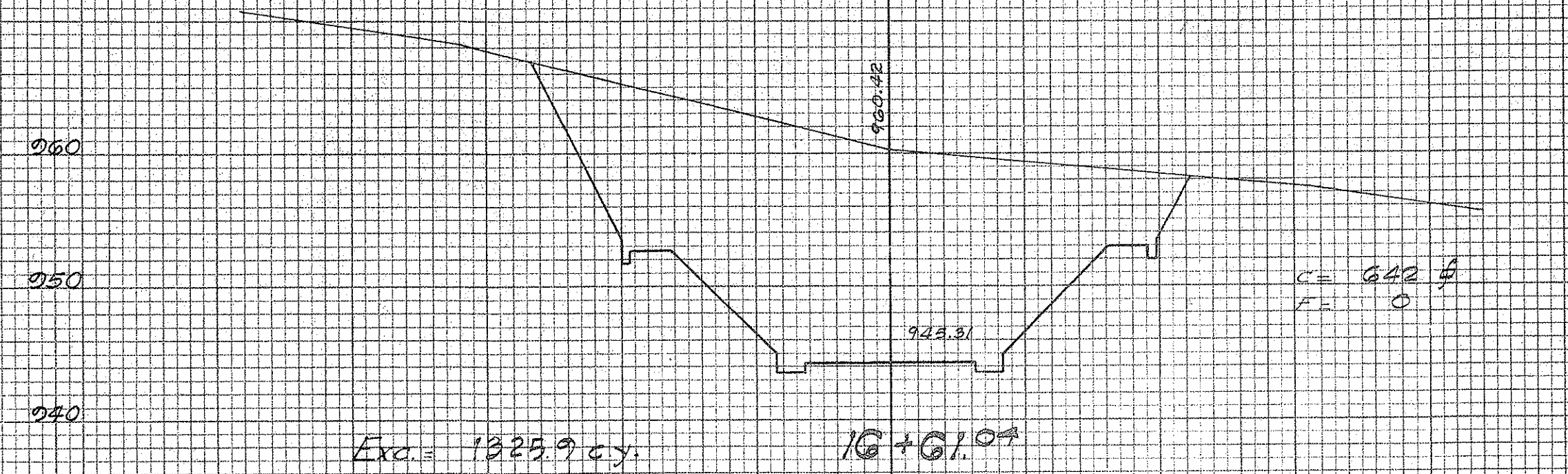
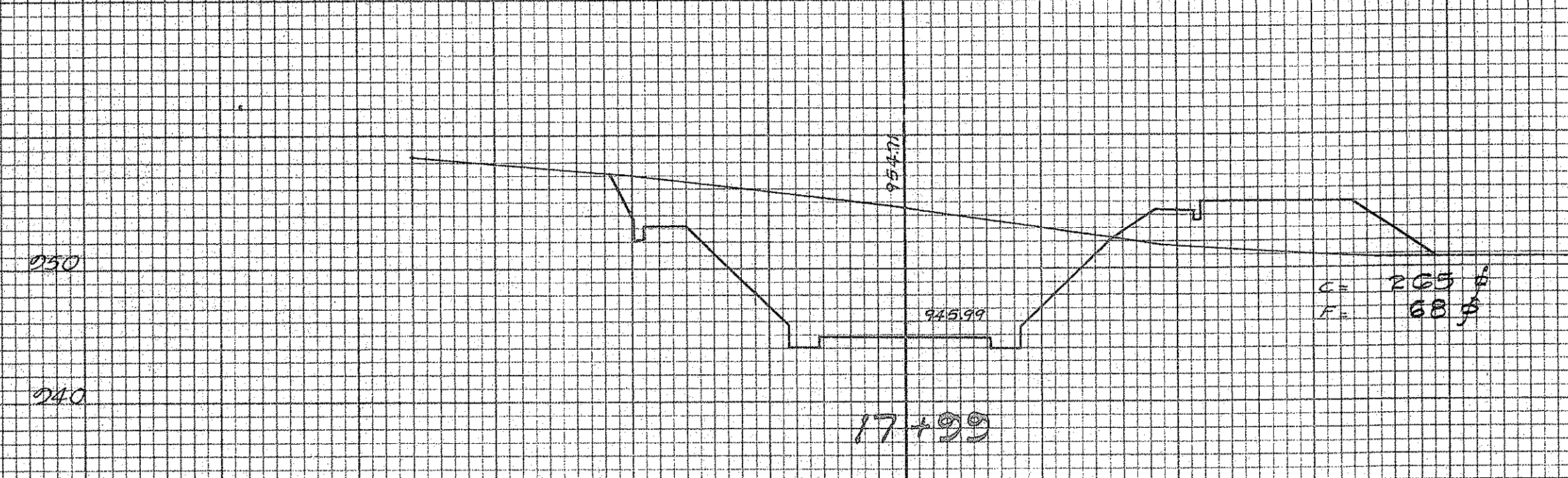
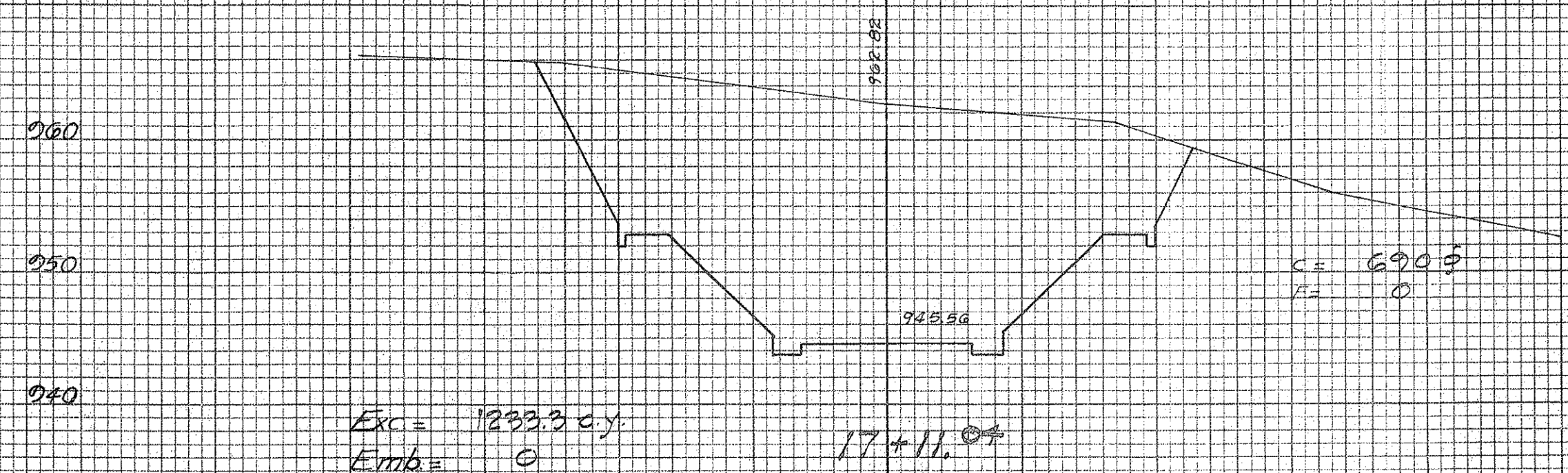
W.S.	PROFILE	C.B.
GR. SEC.	F.B.	S.B.
W.M. BY:	F.W. BY:	S. BY:

SECTION C JOB NO. 26-53 DWG. S-11



FINAL SURVEY  
 SURVEYED  
 PLOTTED  
 TEMPLATE  
 NO. \_\_\_\_\_  
 DATE \_\_\_\_\_  
 BY \_\_\_\_\_  
 NOTE BOOK  
 AREAS  
 CHECKED

ORIGINAL SURVEY  
 SURVEYED  
 PLOTTED  
 TEMPLATE  
 NO. \_\_\_\_\_  
 DATE \_\_\_\_\_  
 BY \_\_\_\_\_  
 NOTE BOOK  
 AREAS  
 CHECKED



DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 MAIN CHANNEL CROSS SECTIONS

ENGINEER S.O.H. R.M. DATE JULY 19, 1929  
 DRAFTSMAN J.N.S. CHECKED BY S.O.H. R.M.  
 SCALE 1/4" = 1' HORIZ. 1" = 10' VERT.  
 TRACER J.N.S.  
 APPROVED *S.O.H. R.M.* APPROVED *J.W. Butzger*  
 CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
*[Signature]*  
 ENGINEER, KALIHI TUNNEL

W.S.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S. BY

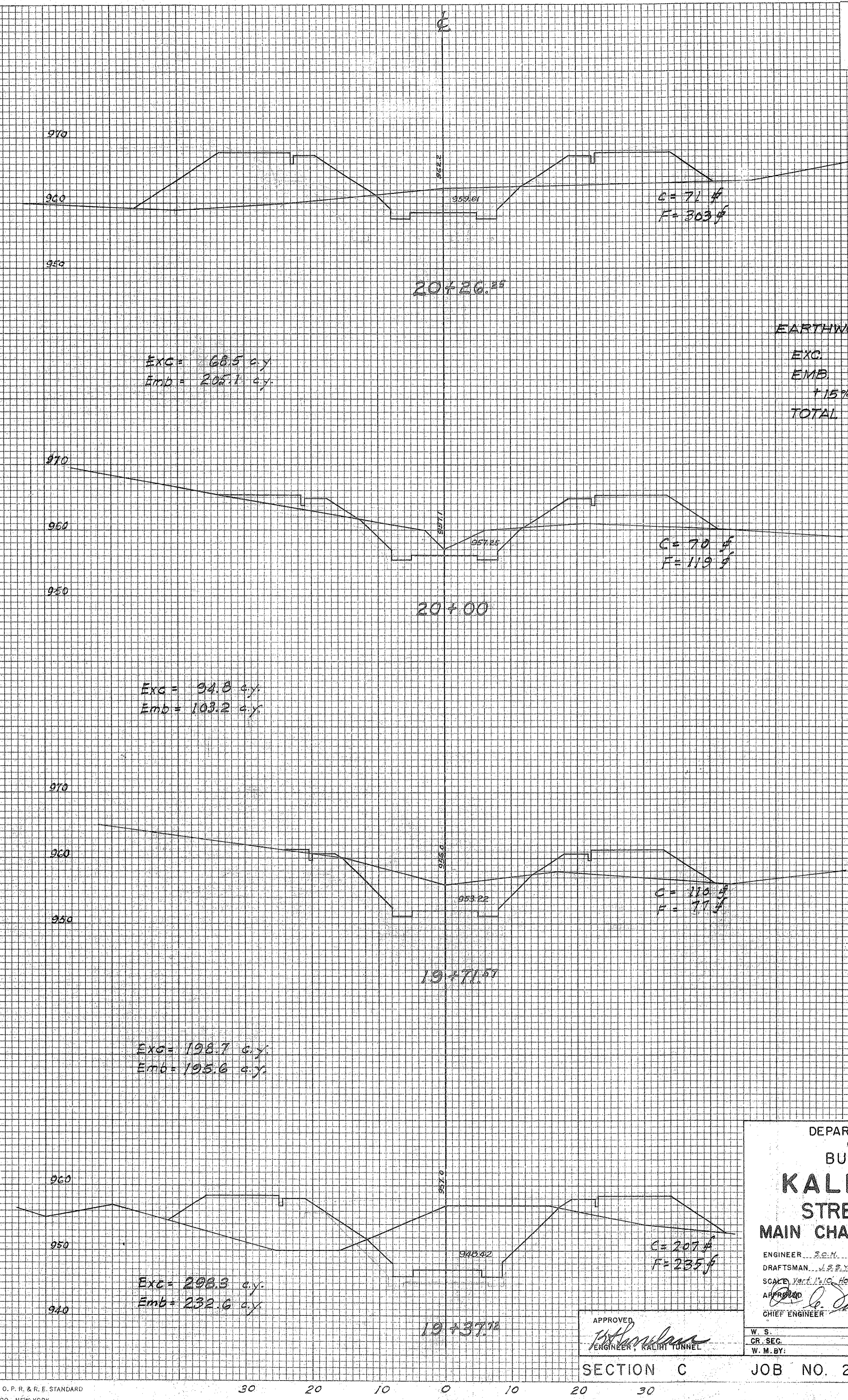
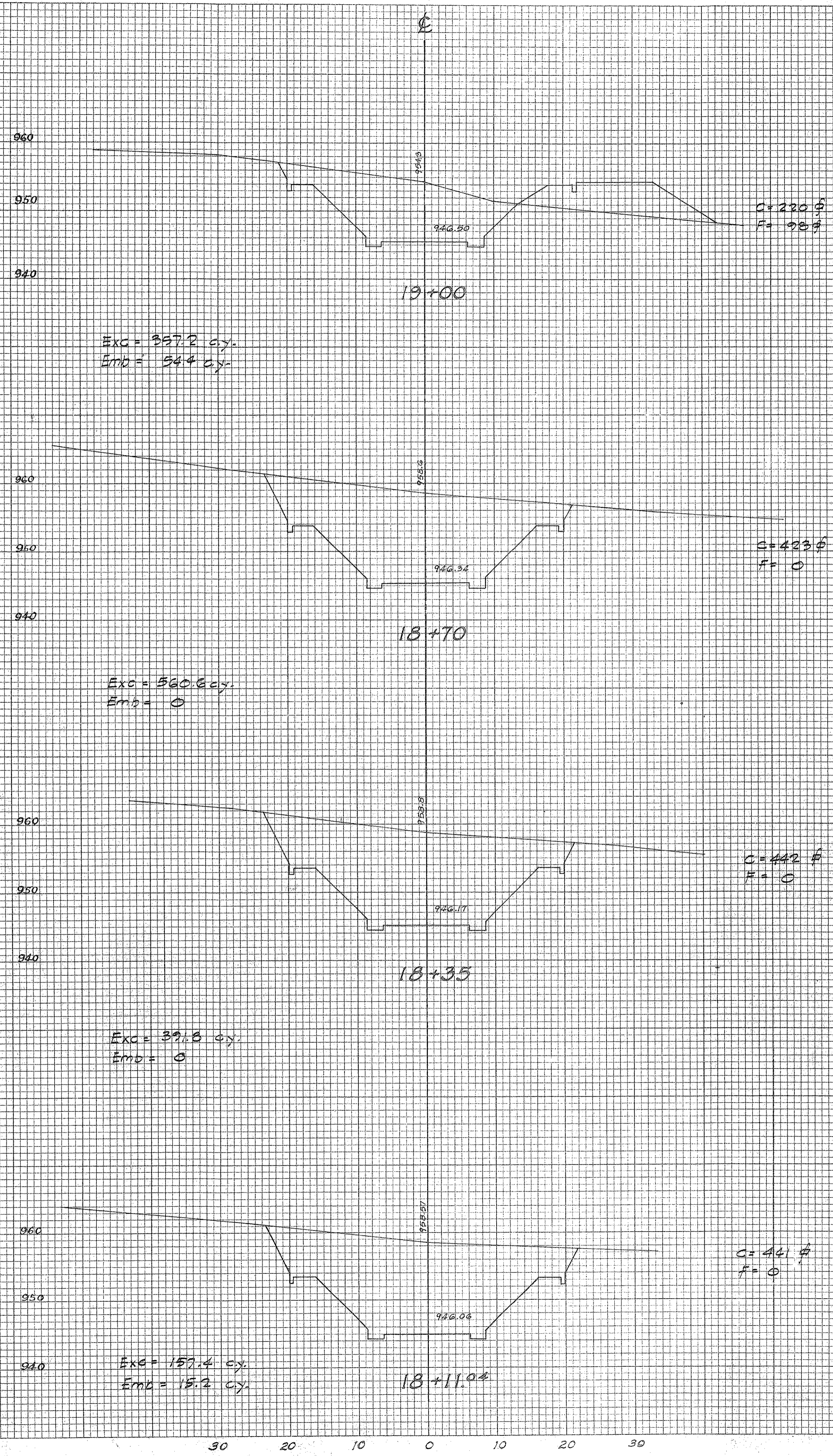
SECTION C JOB NO. 26 - 53 DWG. S-12

FILE	POCKET	FOLDER	NO.
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FINAL SURVEY PLOTTED  
 SURVEYED PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_

ORIGINAL SURVEY PLOTTED  
 SURVEYED PLOTTED  
 NOTE BOOK NO. \_\_\_\_\_  
 AREAS CHECKED \_\_\_\_\_



**EARTHWORK SUMMARY**

EXC.	36158.6 C.Y.
EMB.	4827.4 C.Y.
+15%	724.1 C.Y.
<b>TOTAL EMB.</b>	<b>5551.5 C.Y.</b>

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

## KALIHI TUNNEL STREAM DIVERSION MAIN CHANNEL CROSS SECTIONS

ENGINEER: S.C.H. DATE: JULY 15, 1953  
 DRAFTSMAN: J.S.S. CHECKED BY: S.C.H. - P.H.  
 SOURCE: Sect. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
 TRACER: S.J. - H.S.  
 APPROVED: *S. Carmichael* CHIEF ENGINEER  
 APPROVED: *W. Butzger* BUREAU ENGINEER

W.S. \_\_\_\_\_ PROFILE \_\_\_\_\_ C.B. \_\_\_\_\_  
 GR. SEC. \_\_\_\_\_ F.B. \_\_\_\_\_ S.B. \_\_\_\_\_  
 W.M. BY: \_\_\_\_\_ F.W. BY: \_\_\_\_\_ S. BY: \_\_\_\_\_

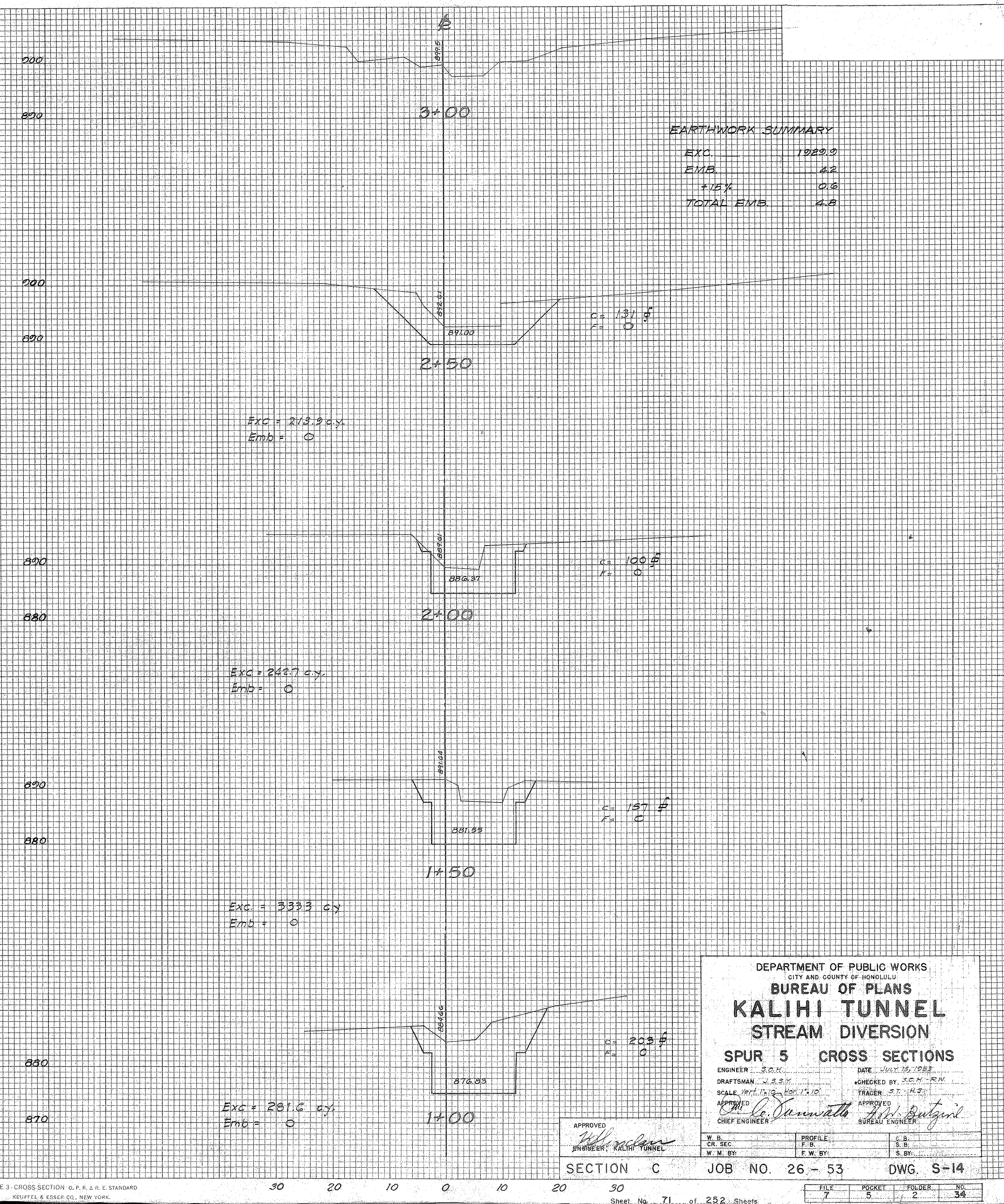
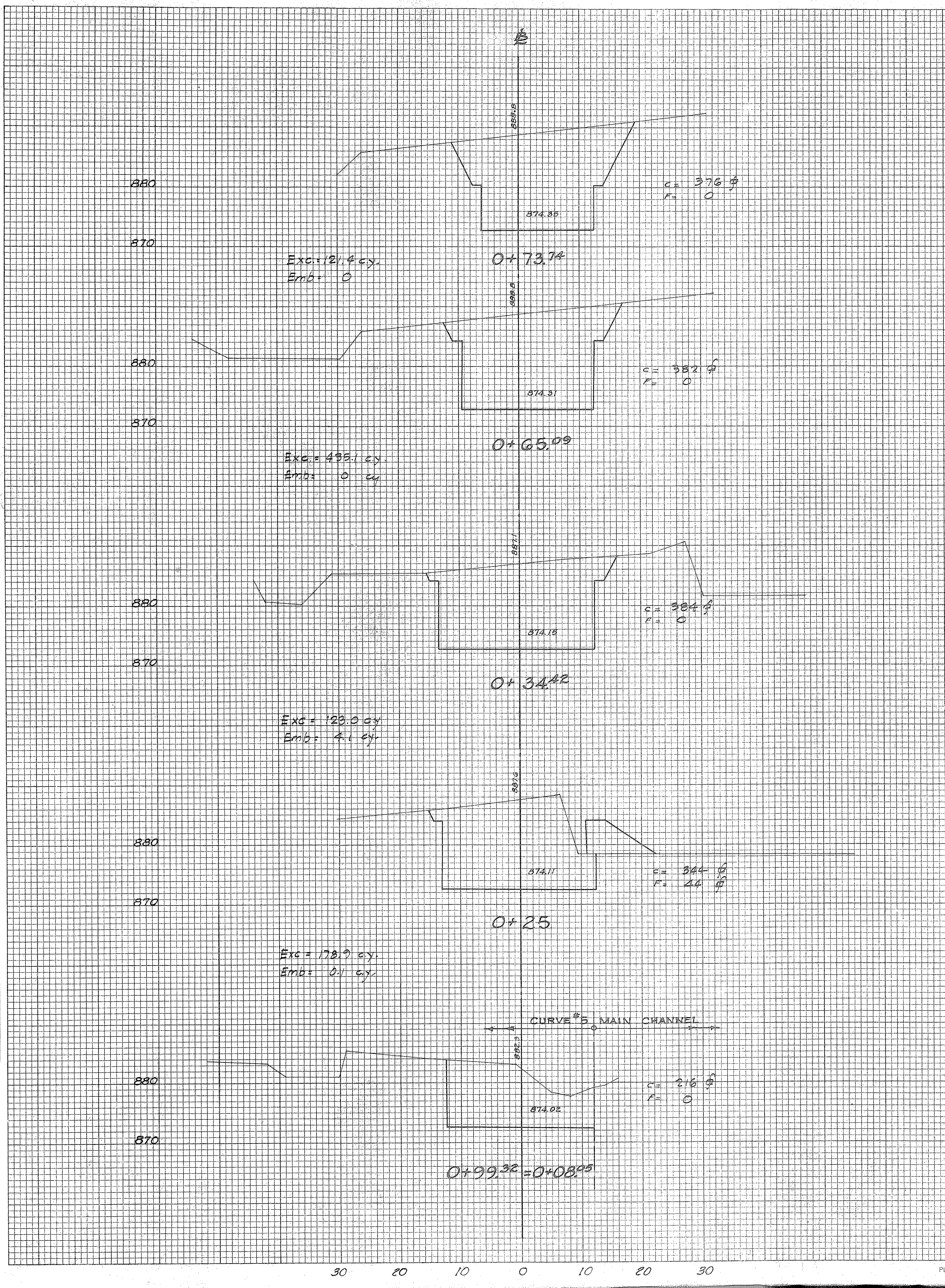
**SECTION C** JOB NO. 26-53 DWG. S-13

FILE	POCKET	FOLDER	NO.
7	5	2	33



FINAL SURVEY  
 SURVEYED  
 PLOTTED  
 TEMPLATE  
 AREAS  
 CHECKED

ORIGINAL SURVEY  
 SURVEYED  
 PLOTTED  
 TEMPLATE  
 AREAS  
 CHECKED



**EARTHWORK SUMMARY**

EXC.	1029.9
EMB.	4.2
+15%	0.6
TOTAL EMB.	4.8

DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
**BUREAU OF PLANS**  
**KALIHI TUNNEL**  
**STREAM DIVERSION**  
**SPUR 5 CROSS SECTIONS**

ENGINEER: S.C.H. DATE: JULY 15, 1953  
 DRAFTSMAN: W.S.P. CHECKED BY: S.C.H. - R.H.  
 SCALE: 1/4" = 1'-0" TRACER: S.P. - H.S.  
 APPROVED: *S. C. H.* APPROVED: *H. S. P.*  
 CHIEF ENGINEER: *S. C. H.* BUREAU ENGINEER: *H. S. P.*

W.B. CR. SEC. F. BY. S. BY.  
 W.M. BY. F.W. BY. S. BY.

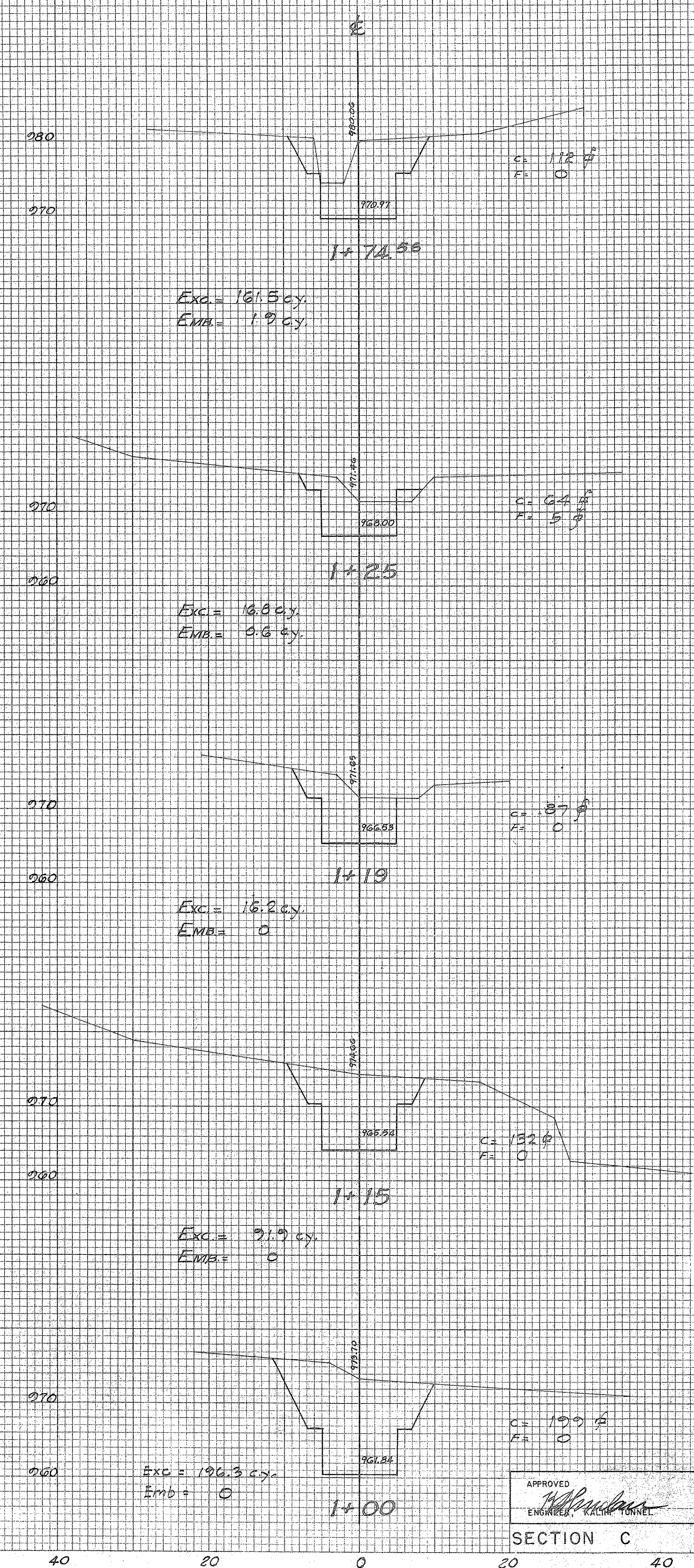
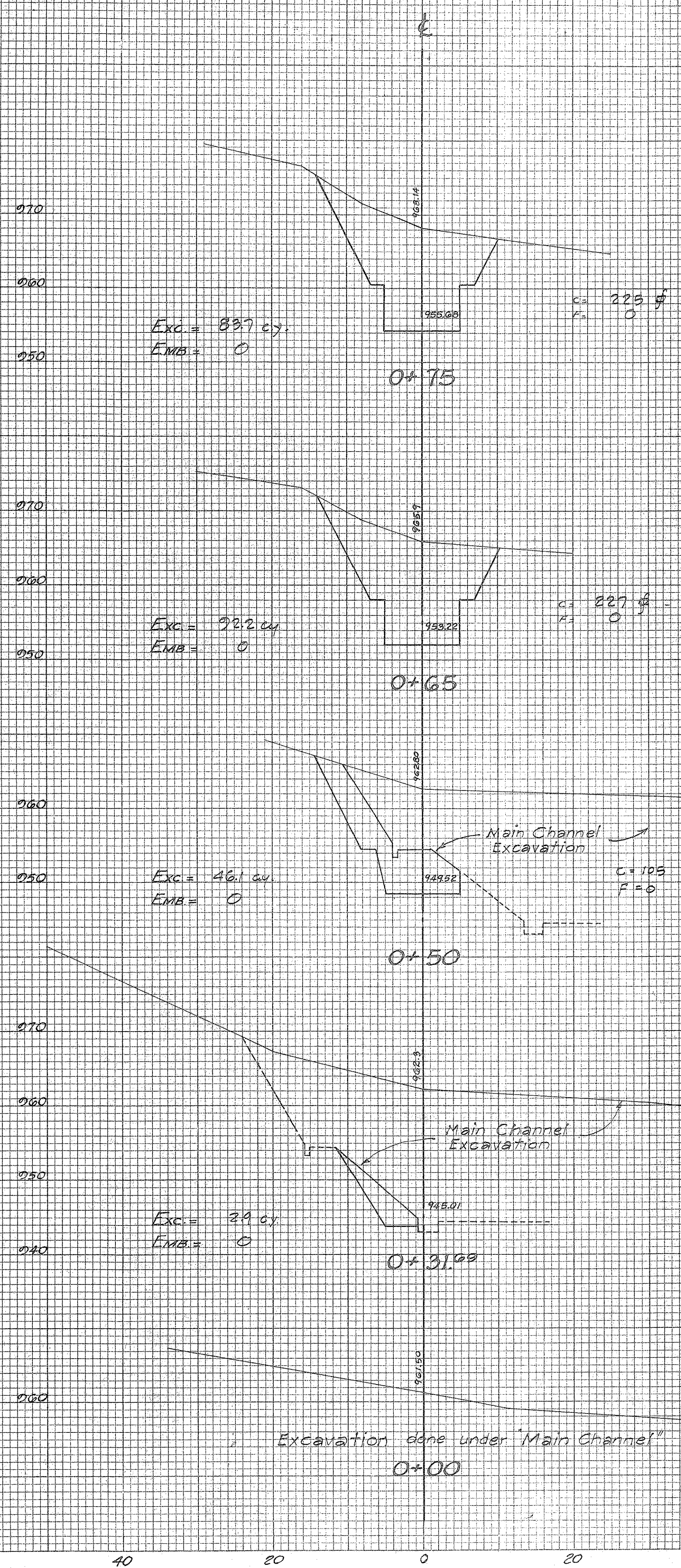
APPROVED  
*[Signature]*  
 ENGINEER, KALIHI TUNNEL

SECTION C JOB NO. 26-53 DWG. S-14



FINAL SURVEY SURVEYED BY DATE  
 SURVEY PLOTTED BY  
 NOTE BOOK NO. TEMPLATE NO.  
 AREAS CHECKED

ORIGINAL SURVEY SURVEYED BY DATE  
 SURVEY PLOTTED BY  
 NOTE BOOK NO. TEMPLATE NO.  
 AREAS CHECKED



**EARTHWORK SUMMARY**

Exc.	1076 cy
Emb.	2.5 cy
+15%	0.4 cy
<b>TOTAL EMB.</b>	<b>2.9 cy</b>

Excavation done under "Main Channel"

DEPARTMENT OF PUBLIC WORKS  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION  
 SPUR 6 CROSS SECTIONS

ENGINEER: J. J. ... DATE: JULY 15, 1952  
 DRAFTSMAN: J. J. ... CHECKED BY: J. J. ...  
 SCALE: 1" = 10' HORIZ. 1" = 5' VERT.  
 TRACER: S. J. ...  
 APPROVED: *[Signature]* APPROVED: *[Signature]*  
 CHIEF ENGINEER BUREAU ENGINEER

W. B.	C. B.
OR SEC.	S. B.
W. M. BY:	S. BY:

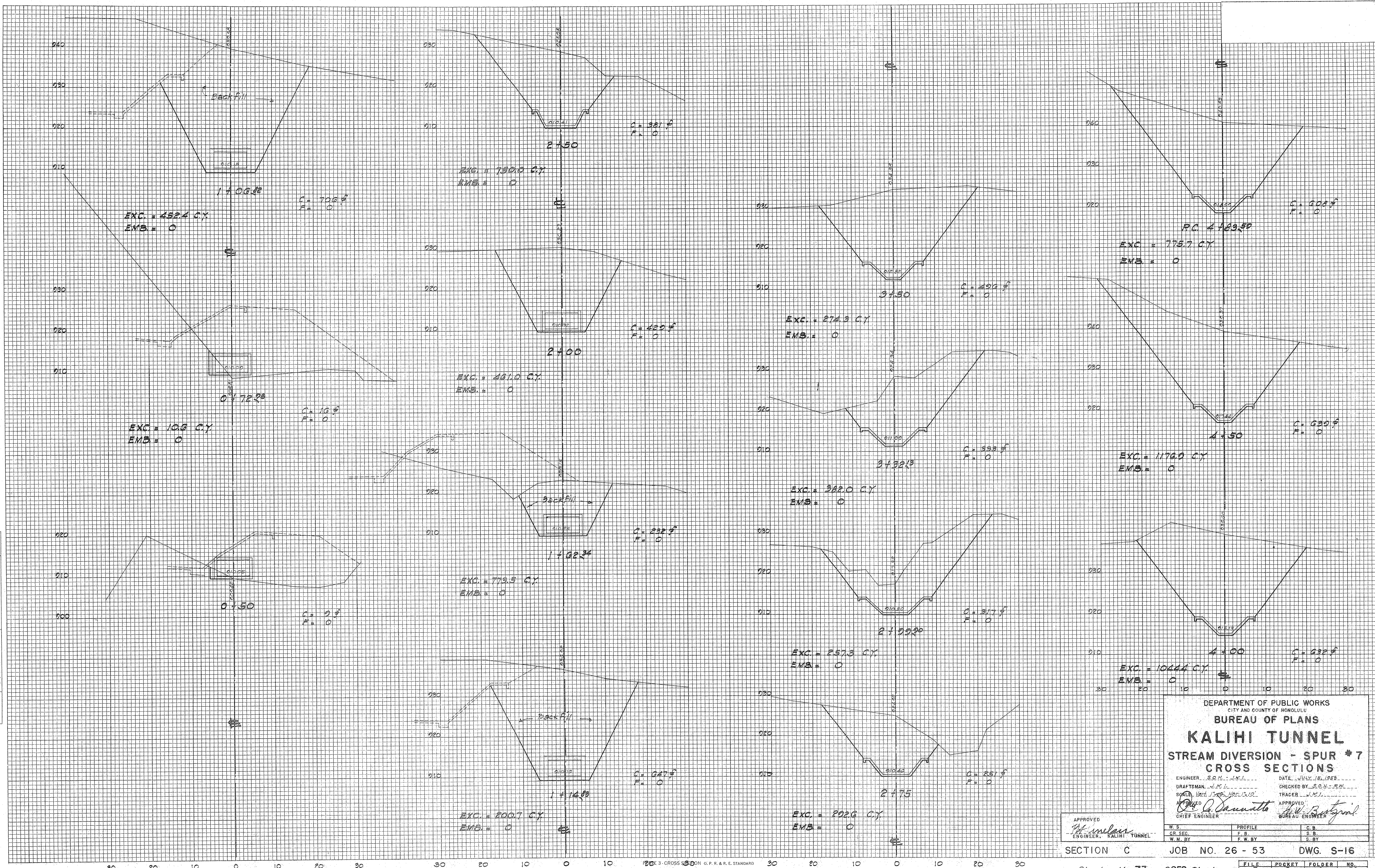
SECTION C JOB NO. 26-53 DWG. S-15

FILE	POCKET	FOLDER	NO.
7	5	2	35



FINAL SURVEY SURVEYED, PLOTTED, TEMPLATE NO. DATE BY

ORIGINAL SURVEY SURVEYED, PLOTTED, TEMPLATE NO. DATE BY



DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
STREAM DIVERSION - SPUR #7  
CROSS SECTIONS

ENGINEER: S.O.H. - J.S.L. DATE: JULY 18, 1928  
DRAFTSMAN: J.K.L. CHECKED BY: S.O.H. - R.W.  
SCALE: Vert. 1" = 20' Hor. 1" = 10'  
TRACER: J.S.L.  
APPROVED: *[Signature]* APPROVED: *[Signature]*  
CHIEF ENGINEER BUREAU ENGINEER

APPROVED: *[Signature]*  
ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	C. B.
GR. SEC.	F. B.	S. B.
W. M. BY	F. W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. S-16

Sheet No. 73 of 252 Sheets

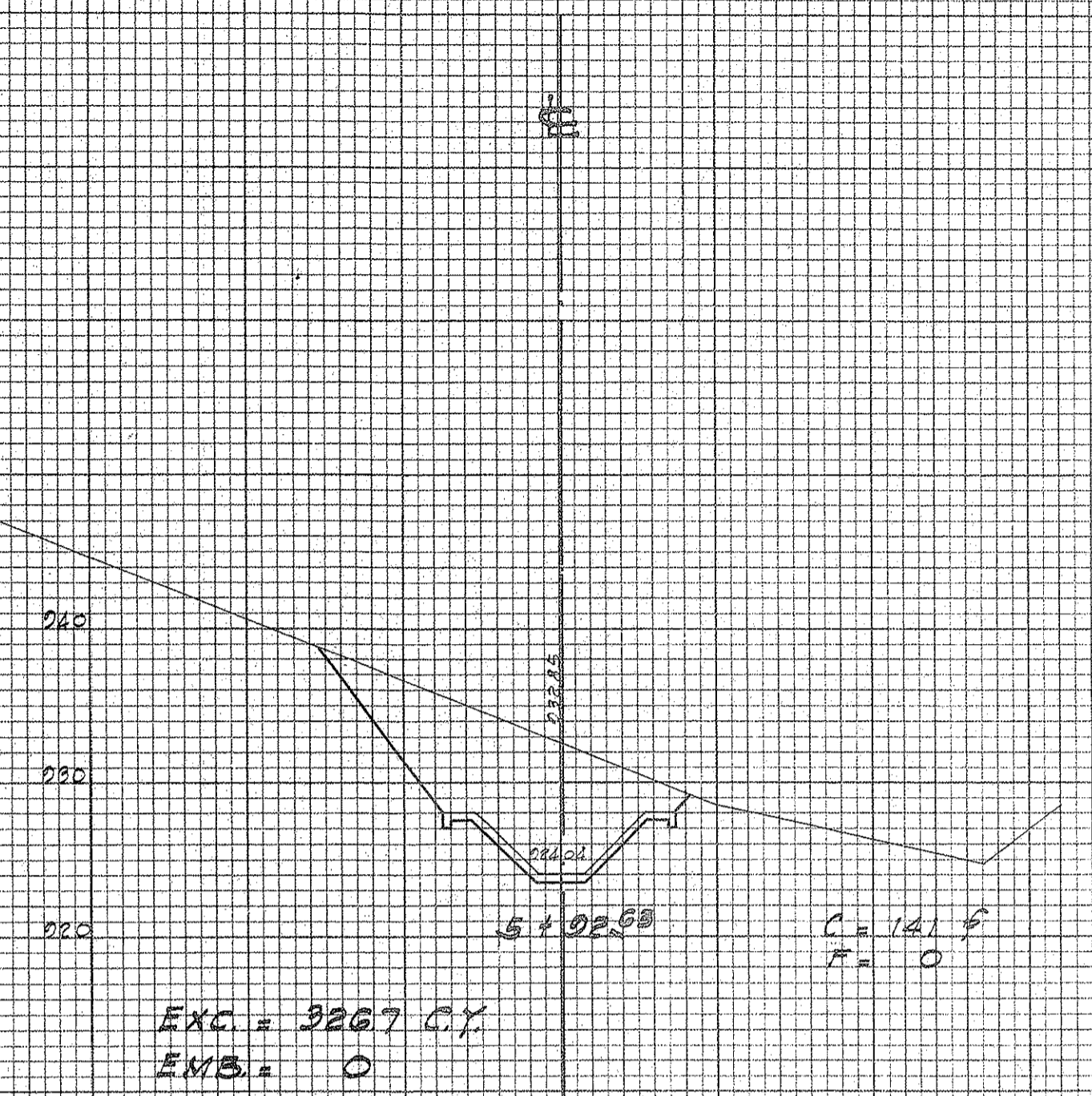
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P.O. 3-CROSS SECTION O.P.R. & R.E. STANDARD  
KEUFFEL & ESSER CO., NEW YORK

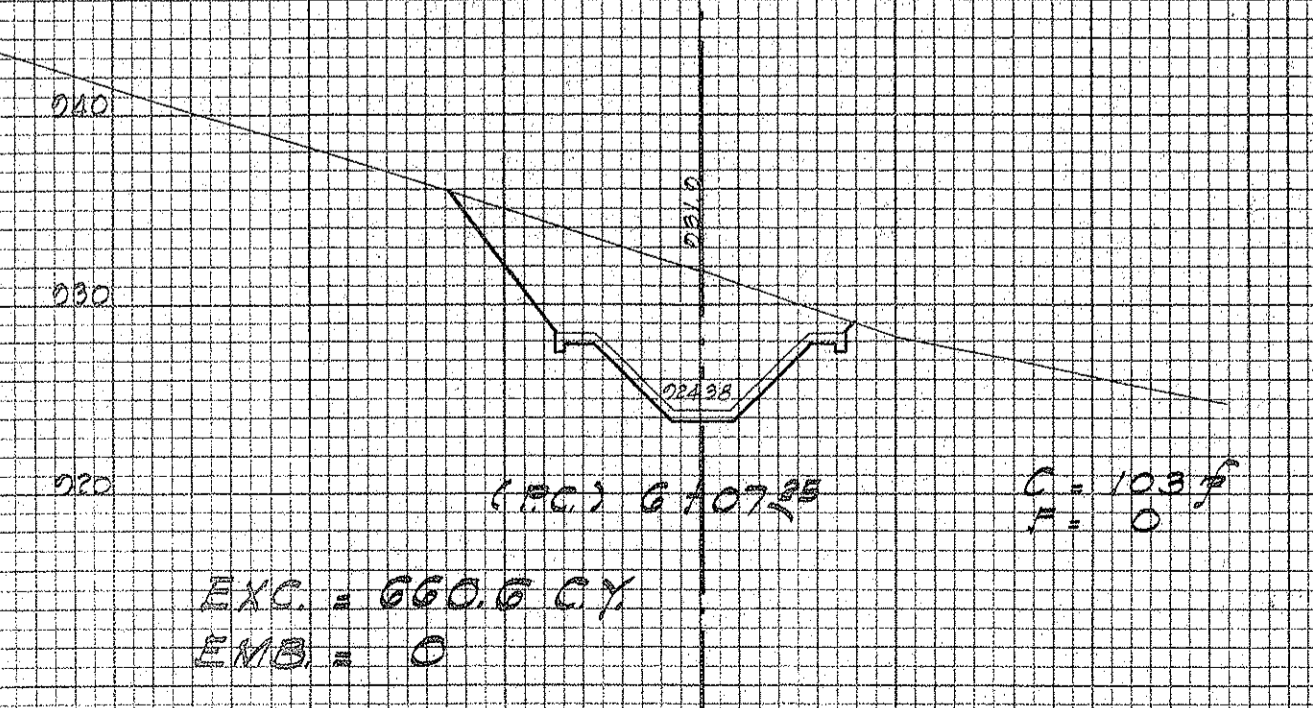
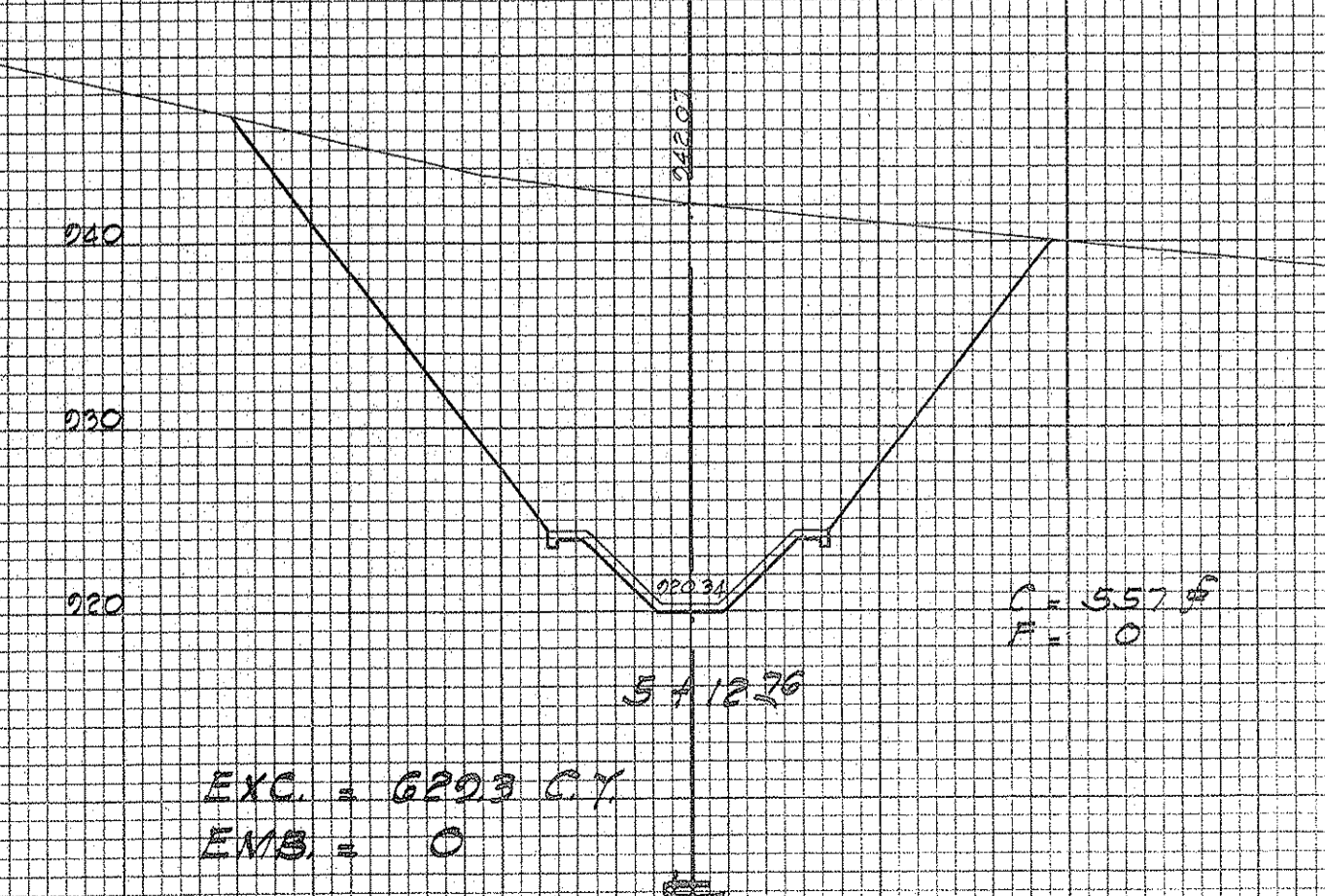
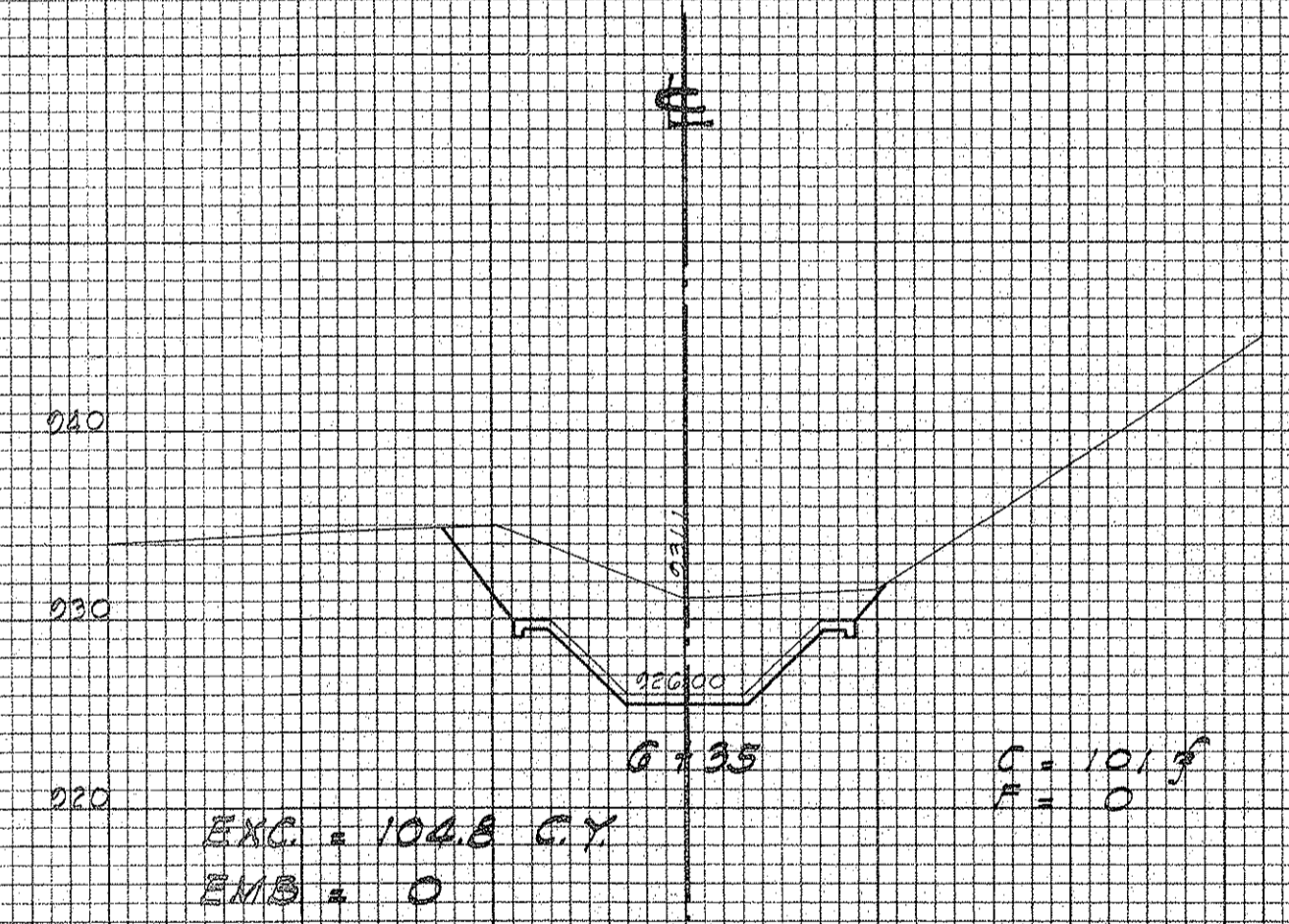
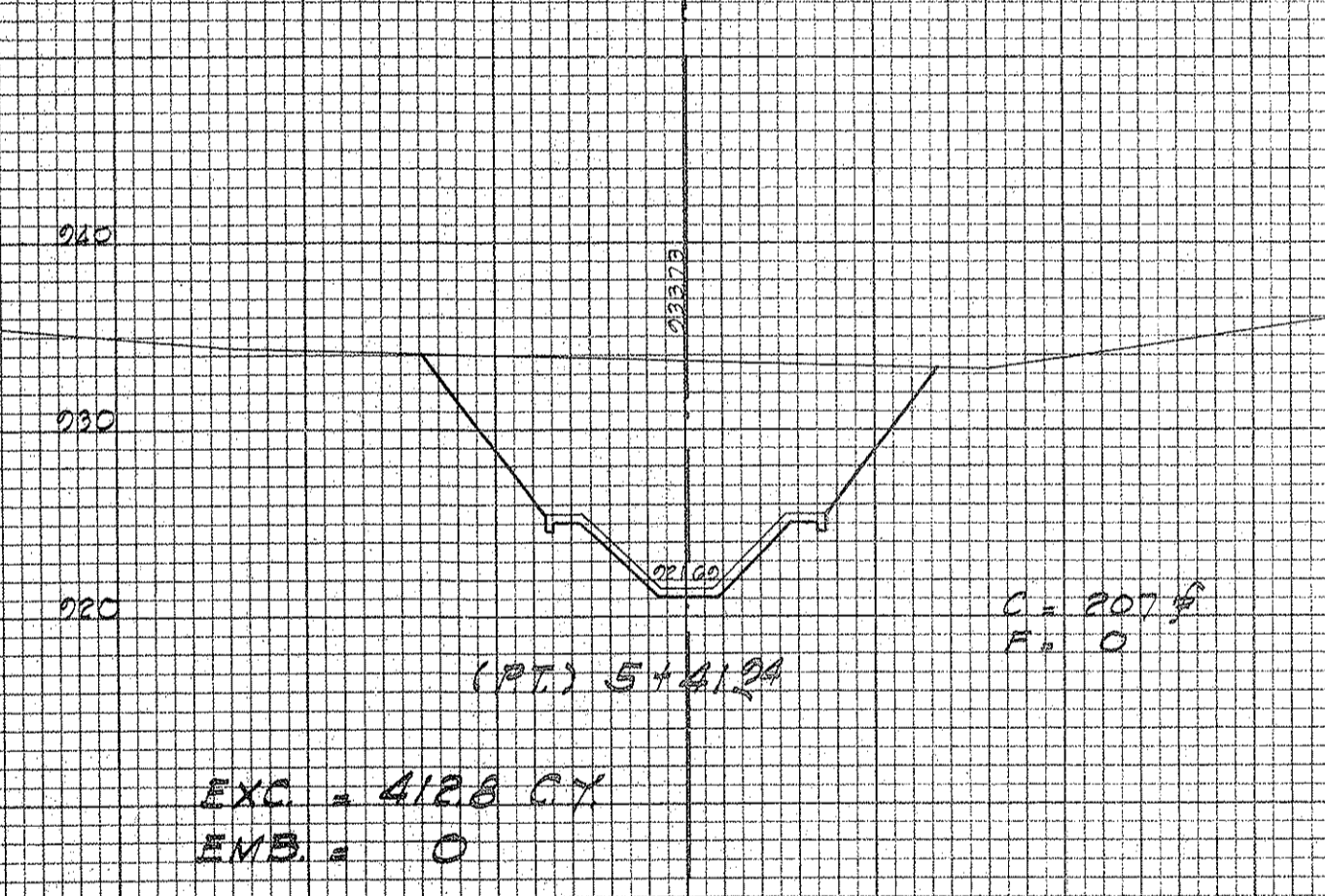


FINAL SURVEY	SURVEYED	DATE
NOTE BOOK	PLOTTED	
NO.	TEMPLATE	
	AREAS CHECKED	

ORIGINAL SURVEY	SURVEYED	DATE
NOTE BOOK	PLOTTED	
NO.	TEMPLATE	
	AREAS CHECKED	



EARTHWORK SUMMARY  
 EXC. 8,996.0 C.Y.  
 EMB. 0.0 C.Y.



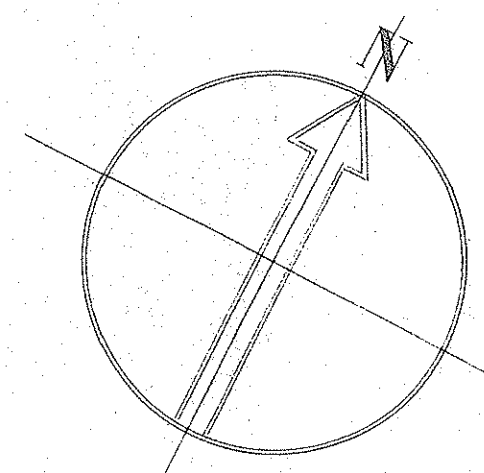
DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 STREAM DIVERSION - SPUR # 7  
 CROSS SECTIONS

ENGINEER: J.C.H. DATE: JULY 16, 1953  
 DRAFTSMAN: J.K.L. CHECKED BY: J.C.H.-R.M.  
 SCALE: VERT. 1" = 10' HOR. 1" = 10'  
 TRACER: J.K.L.  
 APPROVED: *Le Vanwalla* CHIEF ENGINEER  
 APPROVED: *H.W. Butz* BUREAU ENGINEER

APPROVED	PROFILE	C.B.
<i>H.W. Butz</i>	F.B.	S.B.
ENGINEER, KALIHI TUNNEL	F.W. BY	S. BY

SECTION C JOB NO. 26 - 53 DWG. S-17

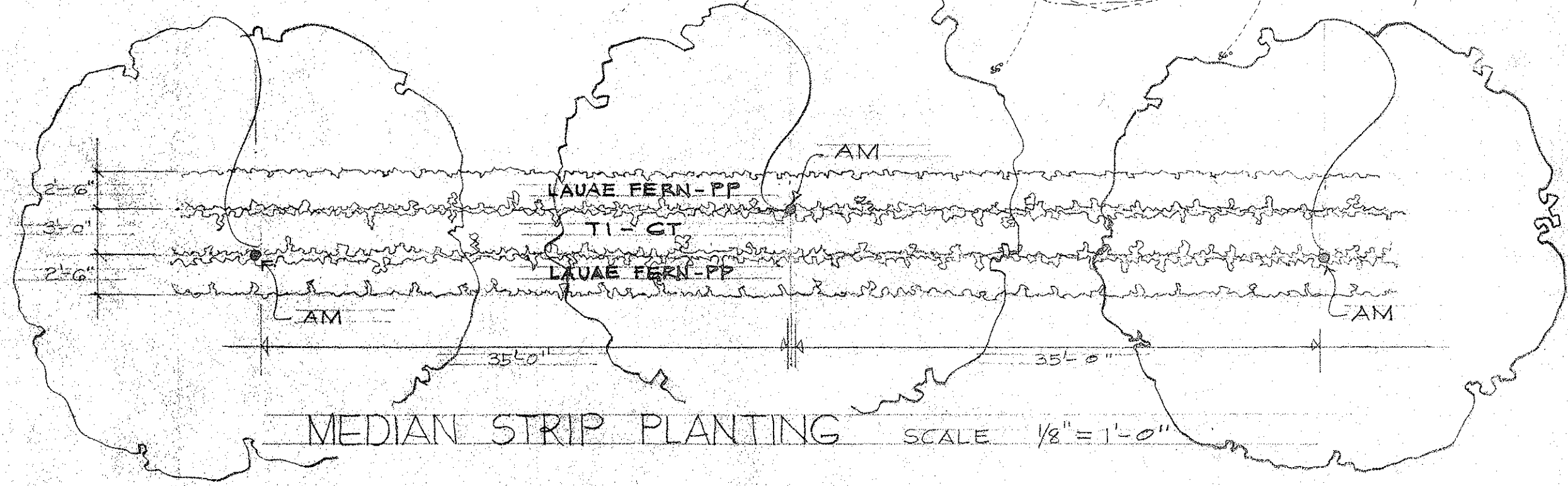
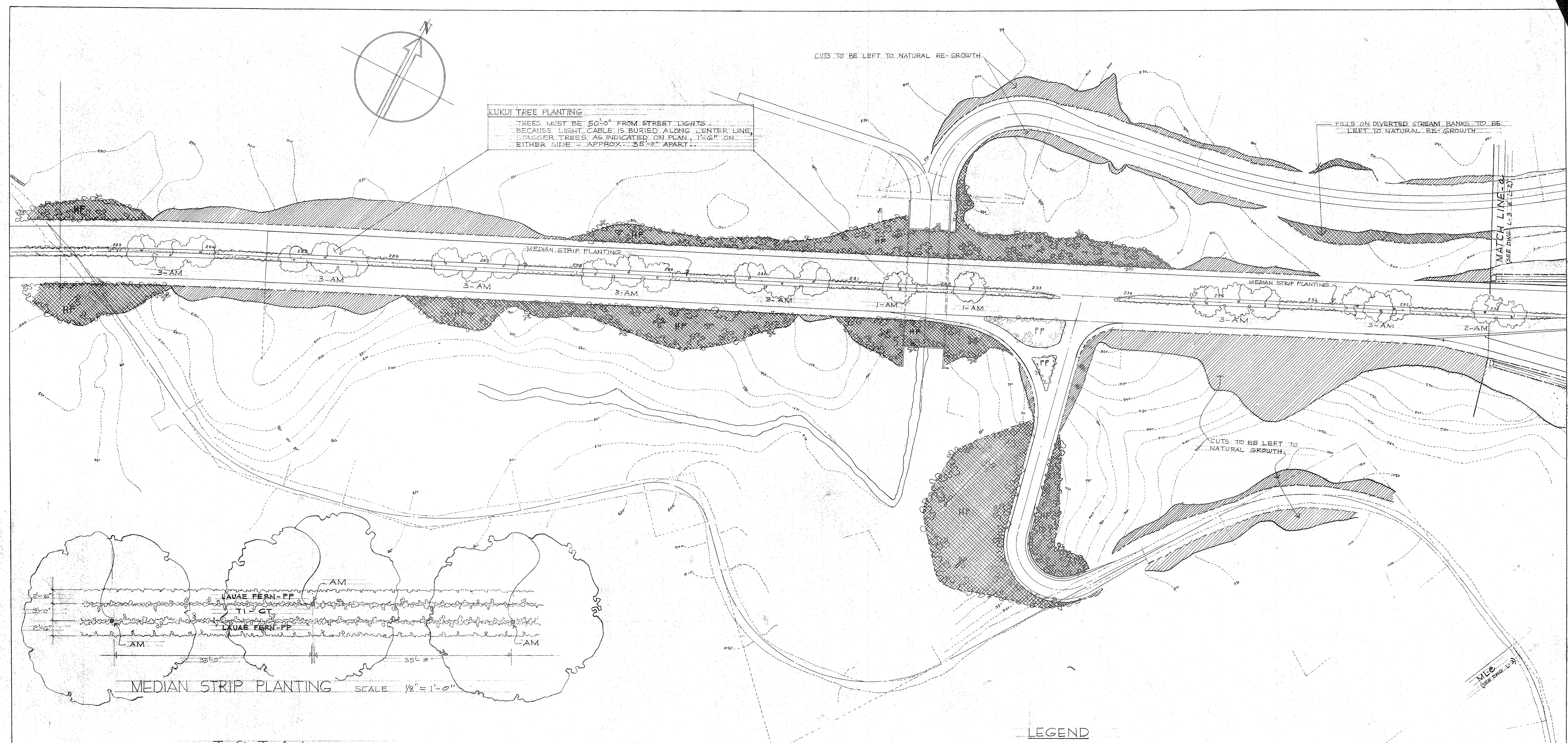




**KUKUI TREE PLANTING**  
 TREES MUST BE 50'-0" FROM STREET LIGHTS  
 BECAUSE LIGHT CABLE IS BURIED ALONG CENTER LINE  
 TAGGER TREES AS INDICATED ON PLAN, 1'-6" ON  
 EITHER SIDE - APPROX. 35'-0" APART.

CUTS TO BE LEFT TO NATURAL RE-GROWTH

FILLS ON DIVERTED STREAM BANKS TO BE  
 LEFT TO NATURAL RE-GROWTH



TOTAL COMPLETE PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QUANTITY
AM	ALEURITES MOLUCCANA	KUKUI NUT	25
BP	BRYOPHYLLUM PINNATUM	AIR PLANT	SEE DWG. L-3
CT	CORDYLINE TERMINALIS	GREEN TI	2,280
EC	EUCALYPTUS CITRIODORA	LEMON SCENTED GUM	5
ER	EUCALYPTUS ROBUSTA	SWAMP MAHOGANY	19
AF	HEDYCHUM FLAVUM	YELLOW GINGER	13,260
HC	HETEROPOGON CONTORTUS	PILI GRASS	SEE DWG. L-3
HT	HIBISCUS TILIACEUS	HAU	8,250
MI	MANGIFERA INDICA	MANGO	13
MO	MORAEA IRIDIODES	DAY IRIS	2,000
PO	PANDANUS ODORATISSIMUS	HALA	16
PC	PENNISETUM CLANDESTINUM	KIKUYU GRASS	6,000
PP	POLYPODIUM PHYMATODES	LAUAE FERN	7,530
TR	TRICHOLAENA ROSAE	RED TOP GRASS	SEE DWG. L-3
SS	SAMANEA SAMAN	MONKEY POD	8
ST	SCAEVOLA GAUDICHAUDIANA	MOUNTAIN NAUPAKA	7,440
SP	BETARIA PALMIFOLIA	PALM GRASS	12,500
LN	LIPPIA NODIFLORA	LIPPIA	8,400

PLANT LIST (THIS SHEET)

KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE	REMARKS
AM	ALEURITES MOLUCCANA	KUKUI NUT	25	5'-8"	PLANT AS DESCRIBED
CT	CORDYLINE TERMINALIS	GREEN TI	2,280	ROOTED CUTTINGS	(3) ROWS 1'-0" APART, TI 2'-0" APART
HF	HEDYCHUM FLAVUM	YELLOW GINGER	3,360	ROOT BULBS	PLANT 2'-0" O.C.
PP	POLYPODIUM PHYMATODES	LAUAE FERN	6,330	ROOT CUTTINGS	(2) ROWS 1'-0" APART ON EITHER SIDE OF MEDIAN STRIP, ROOT CUTTINGS 1'-0" APART.

**LEGEND**  
 = CUT  
 = FILL

**LAW & WILSON**  
 ARCHITECTS & ENGINEERS  
 DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 LANDSCAPING  
 KALIHI APPROACH ROAD

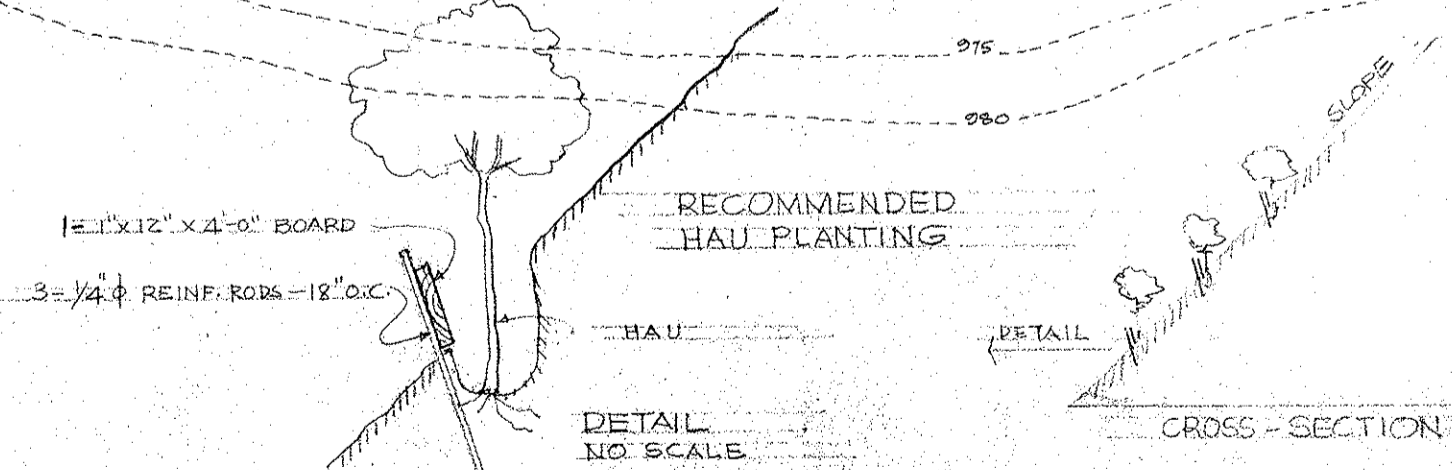
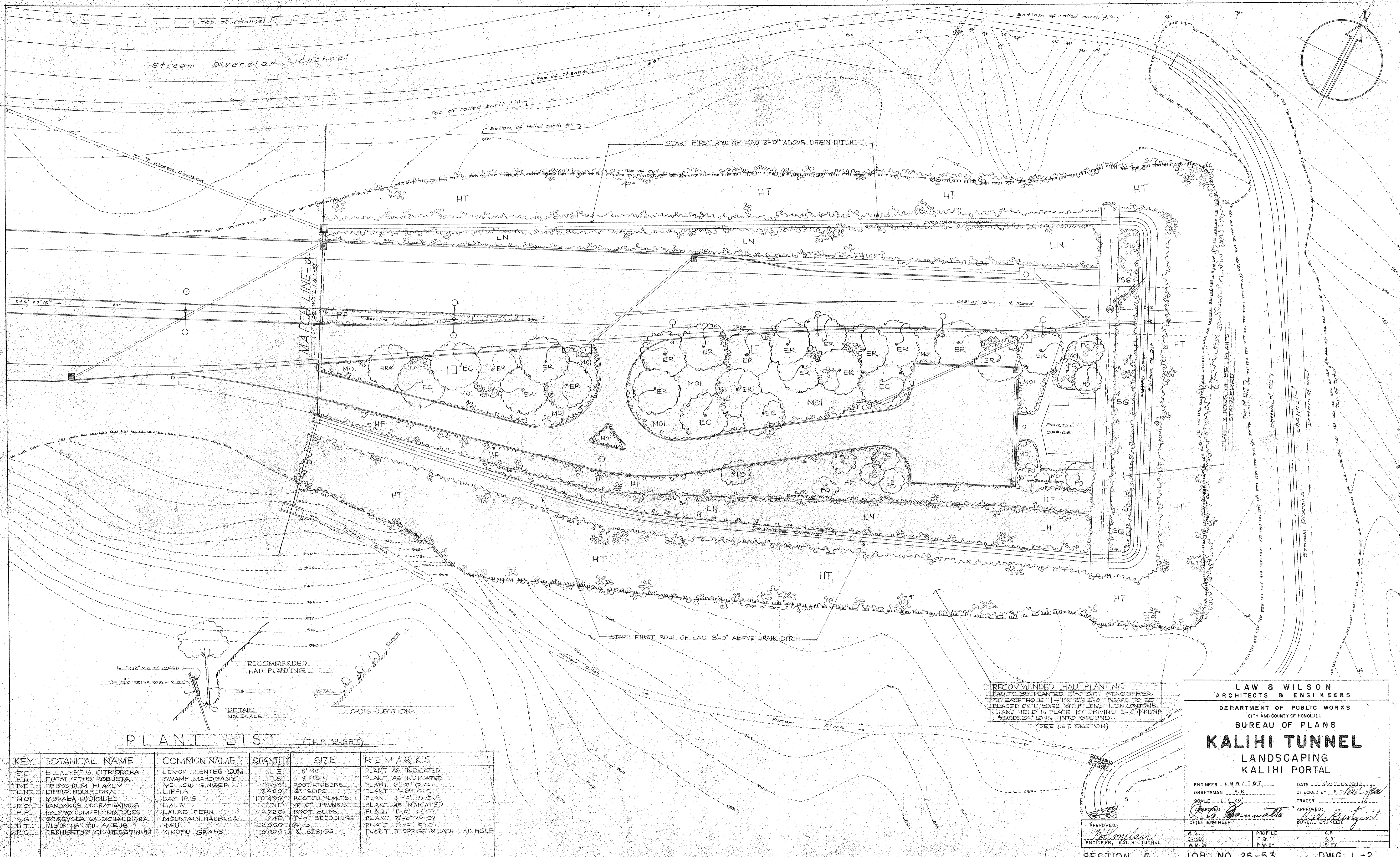
ENGINEER: L.B.W./T.A.T. DATE: JULY 18, 1953  
 DRAFTSMAN: A.B. CHECKED BY: R.T. [Signature]  
 SCALE: 1" = 50' TRACER:  
 APPROVED: [Signature] CHIEF ENGINEER  
 APPROVED: [Signature] BUREAU ENGINEER

APPROVED: [Signature] ENGINEER, KALIHI TUNNEL  
 W.S. \_\_\_\_\_ PROFILE C.B. \_\_\_\_\_  
 CR. SEC. \_\_\_\_\_ F.B. \_\_\_\_\_  
 W.M. BY \_\_\_\_\_ F.W. BY \_\_\_\_\_ S.B. \_\_\_\_\_

SECTION C JOB NO. 26-53 DWG. L-1

FILE	POCKET	FOLDER	NO.
7	5	2	28





**RECOMMENDED HAU PLANTING**  
 HAU TO BE PLANTED 4'-0" O.C. STAGGERED.  
 AT EACH HOLE 1-1/2" X 12" X 4'-0" BOARD TO BE  
 BRIDGED ON 1" EDGE WITH LENGTH ON CONTOUR.  
 AND HELD IN PLACE BY DRIVING 3-1/4" REIN-  
 FORCE RODS 24" LONG INTO GROUND.  
 (SEE DET. SECTION)

**PLANT LIST (THIS SHEET)**

KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE	REMARKS
EC	EUCALYPTUS CITRIODORA	LEMON SCENTED GUM	5	8'-10"	PLANT AS INDICATED
ER	EUCALYPTUS ROBUSTA	SWAMP MAHOGANY	19	8'-10"	PLANT AS INDICATED
HF	HEDYCHUM FLAVUM	YELLOW GINGER	4400	ROOT-TUBERS	PLANT 2'-0" O.C.
LN	LIPPIA NODIFLORA	LIPPIA	8400	6" SLIPS	PLANT 1'-0" O.C.
MOI	MORAEA IRIDIODES	DAY IRIS	10400	ROOTED PLANTS	PLANT 1'-0" O.C.
PO	PANDANUS ODORATISSIMUS	HALA	11	4'-6" TRUNKS	PLANT AS INDICATED
PP	POLYPODIUM PHYMATODES	LAUAE FERN	720	ROOT SLIPS	PLANT 1'-0" O.C.
SG	SCAEVOLA GAUDICHAUDIANA	MOUNTAIN NAUPAKA	2400	1'-0" SEEDLINGS	PLANT 2'-0" O.C.
HT	HIBISCUS TILIACEUS	HAU	2000	4'-5"	PLANT 4'-0" O.C.
PC	PENNISSETUM CLANDESTINUM	KIKUYU GRASS	6000	8" SPRIGS	PLANT 3 SPRIGS IN EACH HAU HOLE

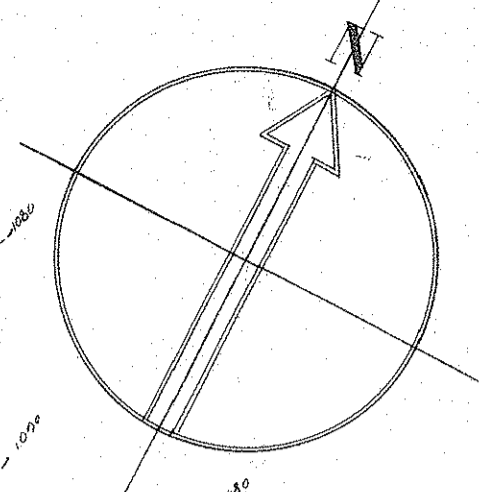
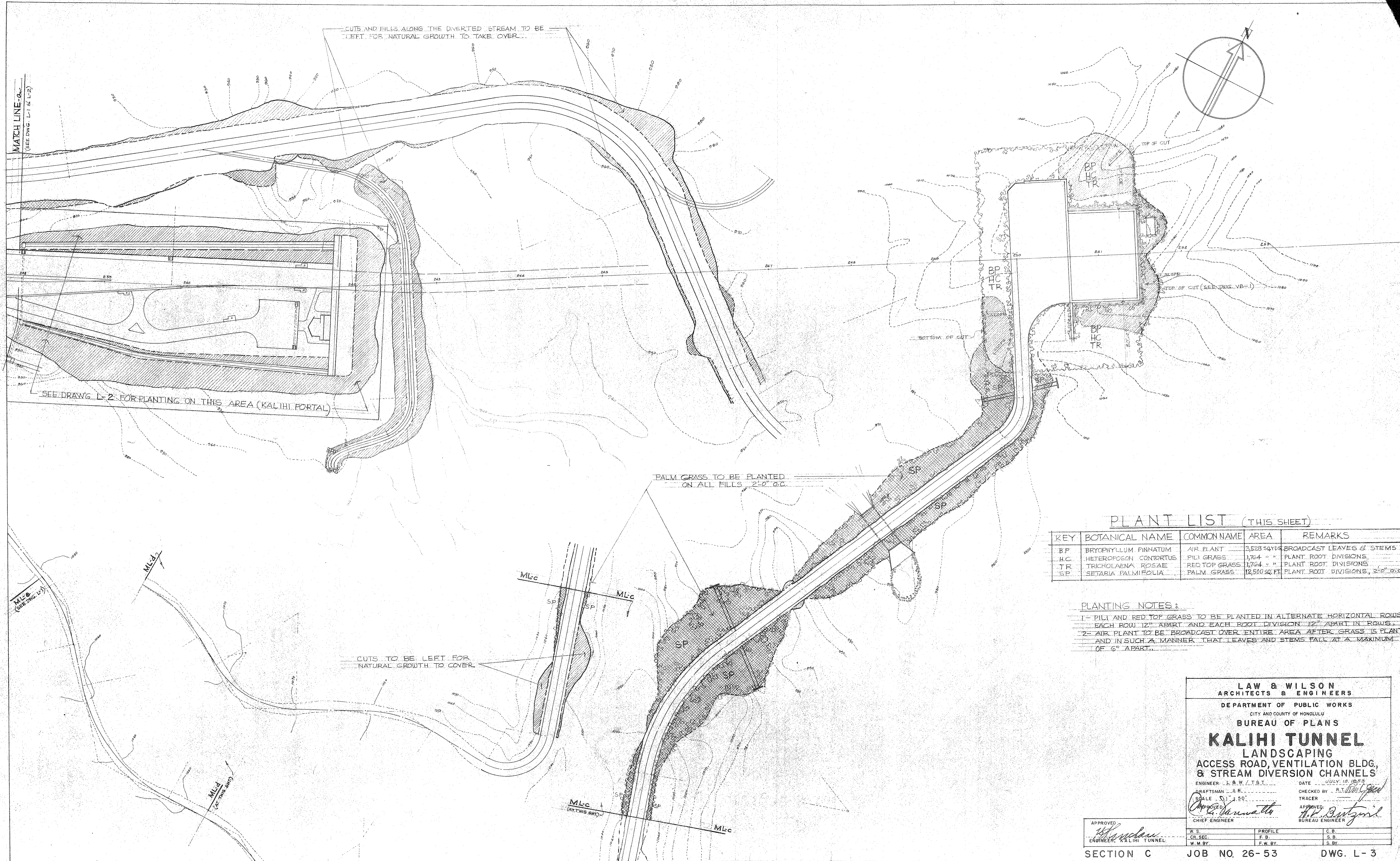
**LAW & WILSON**  
 ARCHITECTS & ENGINEERS  
 DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
**KALIHI TUNNEL**  
 LANDSCAPING  
 KALIHI PORTAL

ENGINEER - L.B.W. LIST DATE - JULY 19, 1989  
 DRAFTSMAN - A.R. CHECKED BY - R.T. [Signature]  
 SCALE - 1" = 20' TRACER  
 APPROVED: [Signature] CHIEF ENGINEER APPROVED: [Signature] BUREAU ENGINEER

W.S. PROFILE C.B.  
 CR. SEC. F.B. S.B.  
 W.M. BY F.W. BY S.B.Y.

SECTION C JOB NO. 26-53 DWG. L-2





**PLANT LIST (THIS SHEET)**

KEY	BOTANICAL NAME	COMMON NAME	AREA	REMARKS
BP	BRYOPHYLLUM PINNATUM	AIR PLANT	3,528 SQ. YDS.	BROADCAST LEAVES & STEMS
HC	HETEROPOGON CONTORTUS	PILI GRASS	1,764 "	PLANT ROOT DIVISIONS
TR	TRICHOLAENA ROSAE	RED TOP GRASS	1,764 "	PLANT ROOT DIVISIONS
SP	SETARIA PALMIFOLIA	PALM GRASS	12,500 SQ. FT.	PLANT ROOT DIVISIONS, 2'-0" O.C.

**PLANTING NOTES:**  
 1- PILI AND RED TOP GRASS TO BE PLANTED IN ALTERNATE HORIZONTAL ROWS. EACH ROW 12" APART AND EACH ROOT DIVISION 12" APART IN ROWS.  
 2- AIR PLANT TO BE BROADCAST OVER ENTIRE AREA AFTER GRASS IS PLANTED AND IN SUCH A MANNER THAT LEAVES AND STEMS FALL AT A MAXIMUM OF 6" APART.

**LAW & WILSON**  
 ARCHITECTS & ENGINEERS  
 DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS

**KALIHU TUNNEL**  
 LANDSCAPING  
 ACCESS ROAD, VENTILATION BLDG.,  
 & STREAM DIVERSION CHANNELS

ENGINEER: J. B. W. T. & T. DATE: JULY 15, 1953  
 DRAFTSMAN: A. R. CHECKED BY: R. T. [Signature]  
 SCALE: 1" = 50' TRACER: [Signature]  
 APPROVED: [Signature] CHIEF ENGINEER  
 APPROVED: [Signature] BUREAU ENGINEER

W.S.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M.B.Y.	F.W.B.Y.	S.B.Y.

SECTION C JOB NO. 26-53 DWG. L-3



PLANT LIST

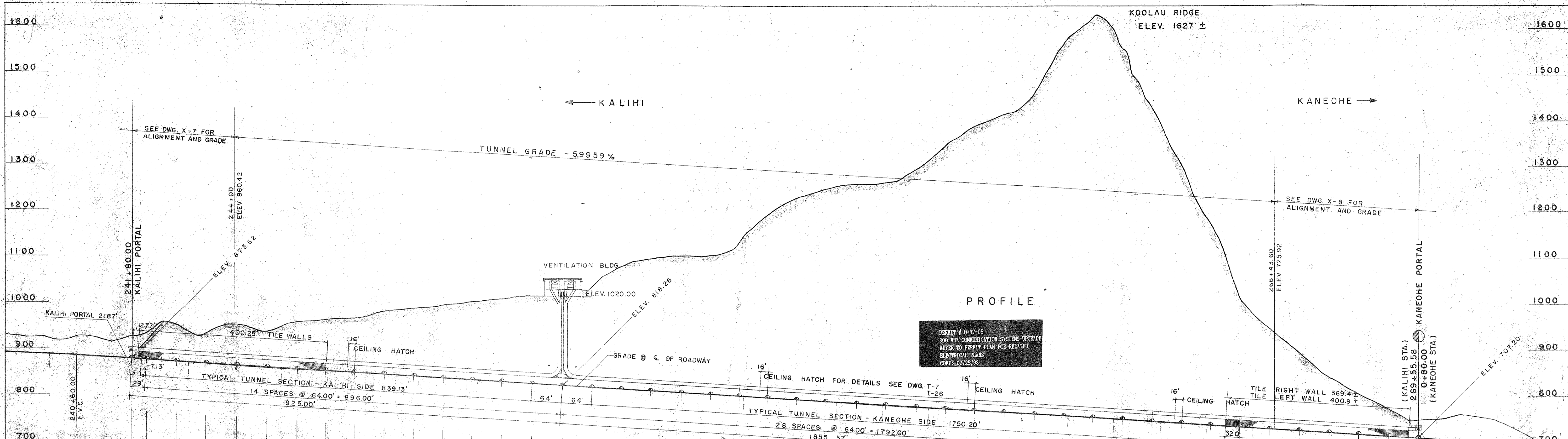
KEY	BOTANICAL NAME	COMMON NAME
HT	HIBISCUS TILIACEUS	HAU
MI	MANGIFERA INDICA	MANGO
MOI	MORAEA IRIDIODES	DAY IRIS
PO	PANDANUS OBOVATISSIMUS	HALA
PP	POLYPODIUM PHYMATODES	LAJAE FERN
SS	SAMANEA SAMAN	MONKEY POD
SG	SCAEVOLA GAUDICHAUDIANA	MOUNTAIN NAUPA



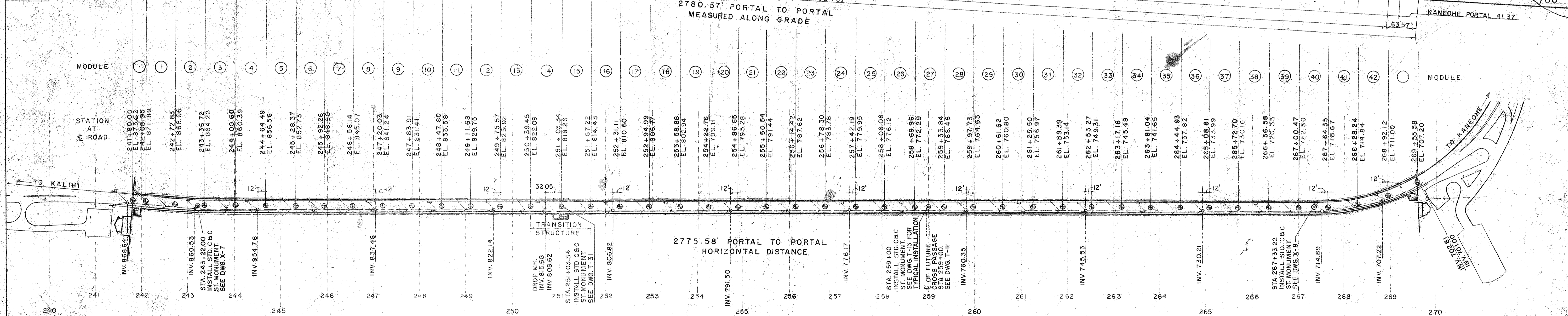
CUT SLOPES TO BE LEFT FOR NATURAL GROWTH TO TAKE OVER

NOTE  
 LOCATION OF MANGOS ON PLAN IS ONLY APPROX.  
 BUT MUST BE PLANTED AT BASE OF FINISHED  
 FILL AND HAU IS TO BE PLANTED FROM MANGOS  
 UP SLOPE TO MOUNTAIN NAUPA. SEE AREA  
 PLAN FOR FINISHED SLOPE - DWG. P-25





PERMIT / C-97-05  
 300 MH COMMUNICATION SYSTEMS UPGRADE  
 REFER TO PERMIT PLAN FOR RELATED  
 ELECTRICAL PLANS  
 COMP. 02/25/98



PLAN

- LEGEND
- ⊙ = STATION AT Ⓢ ROAD
  - ⊙ = DRAINAGE MANHOLE
  - ⊙ = ROADWAY CATCH BASIN
  - ⊙ = GLAZE TILE SECTION IN TUNNEL
  - ⊙ = 4" R.C. DRAIN
  - ⊙ = 6" DRAIN
  - ⊙ = 8" DRAIN
  - ⊙ = STD. C.&C. ST. MONUMENT

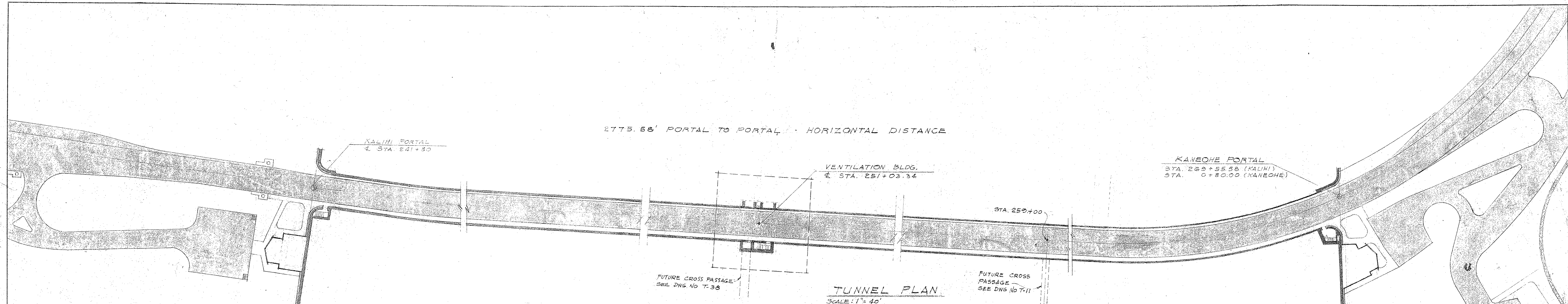
LAW & WILSON  
 ARCHITECTS & ENGINEERS  
 DEPARTMENT OF PUBLIC WORKS  
 CITY AND COUNTY OF HONOLULU  
 BUREAU OF PLANS  
**KALIHI TUNNEL**  
 TUNNEL & SHAFT  
 PLAN & PROFILE

ENGINEER: *W. Lum* DATE: JULY 18 1993  
 DRAFTSMAN: *W.T.* CHECKED BY: *W. Lum*  
 SCALE: 1" = 100' TRACER: *K.M.*  
 APPROVED: *W. Lum* CHIEF ENGINEER  
 APPROVED: *W. Lum* BUREAU ENGINEER

W.S.	PROFILE	C.B.
CR. SEC.	F.B.	S.B.
W.M. BY	F.W. BY	S. BY

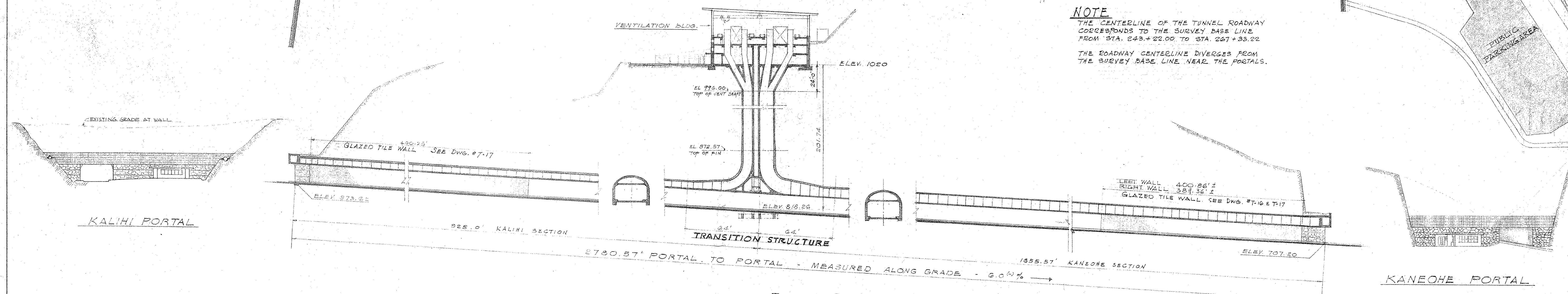
SECTION C JOB NO. 26-53 DWG. T-1



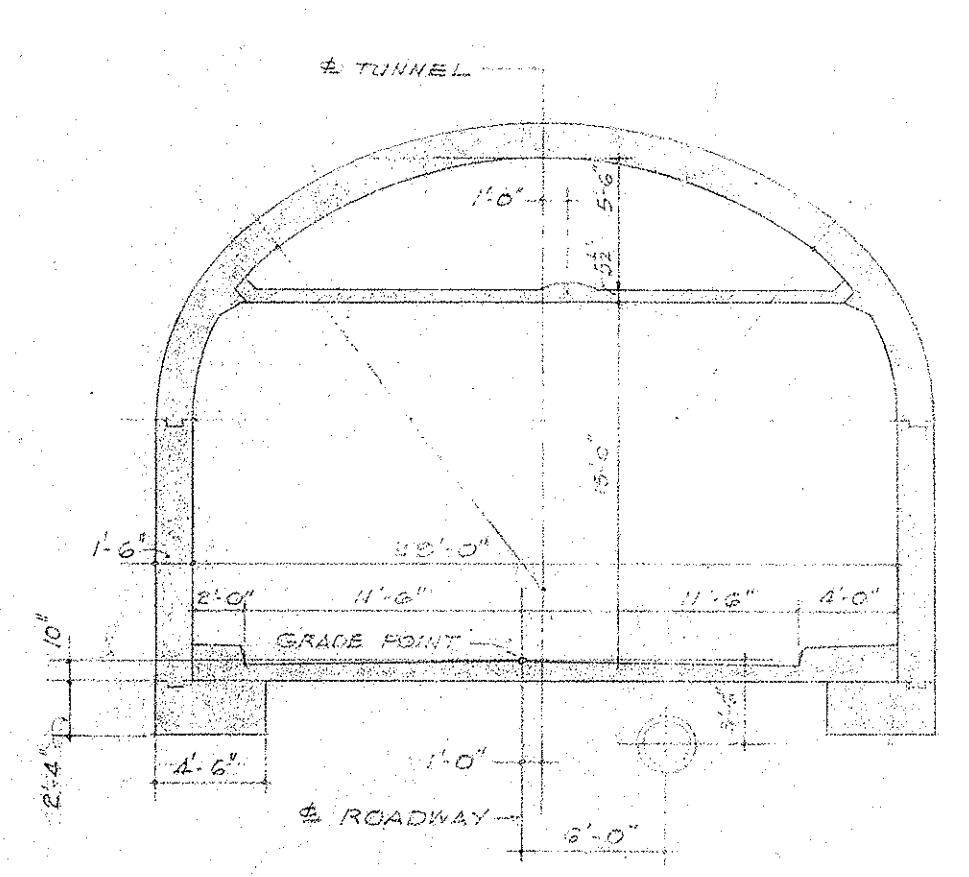


**TUNNEL PLAN**  
SCALE: 1" = 40'

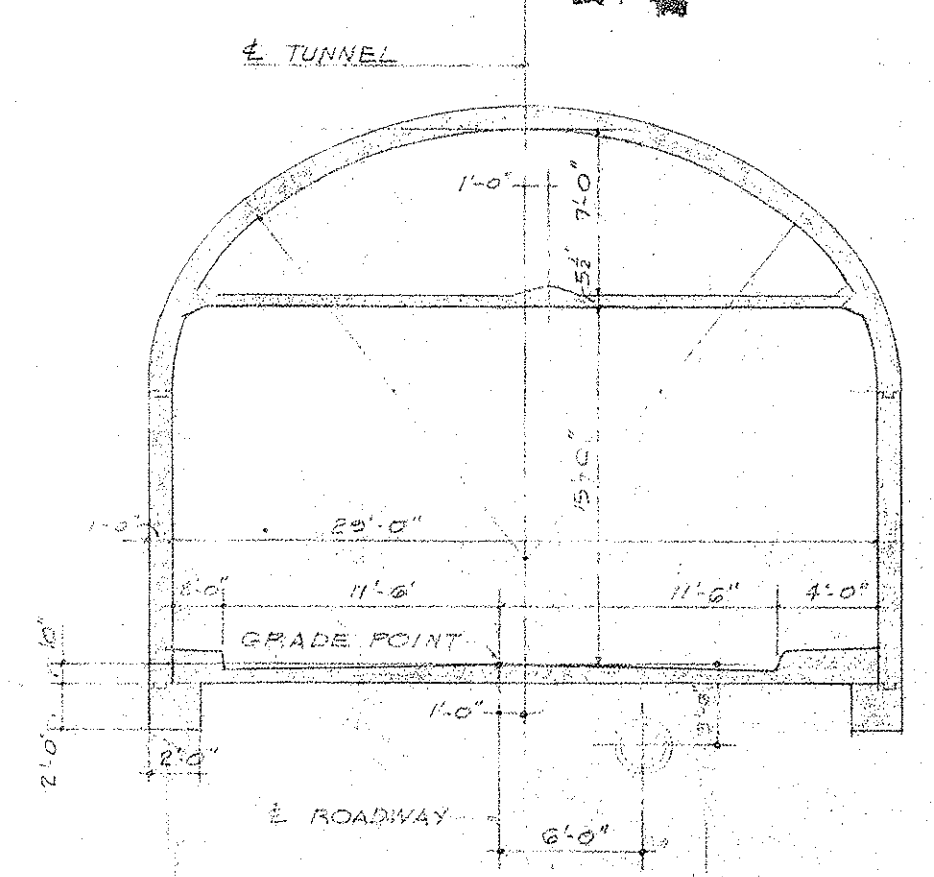
**NOTE**  
THE CENTERLINE OF THE TUNNEL ROADWAY CORRESPONDS TO THE SURVEY BASE LINE FROM STA. 243+22.00 TO STA. 267+33.22. THE ROADWAY CENTERLINE DIVERGES FROM THE SURVEY BASE LINE NEAR THE PORTALS.



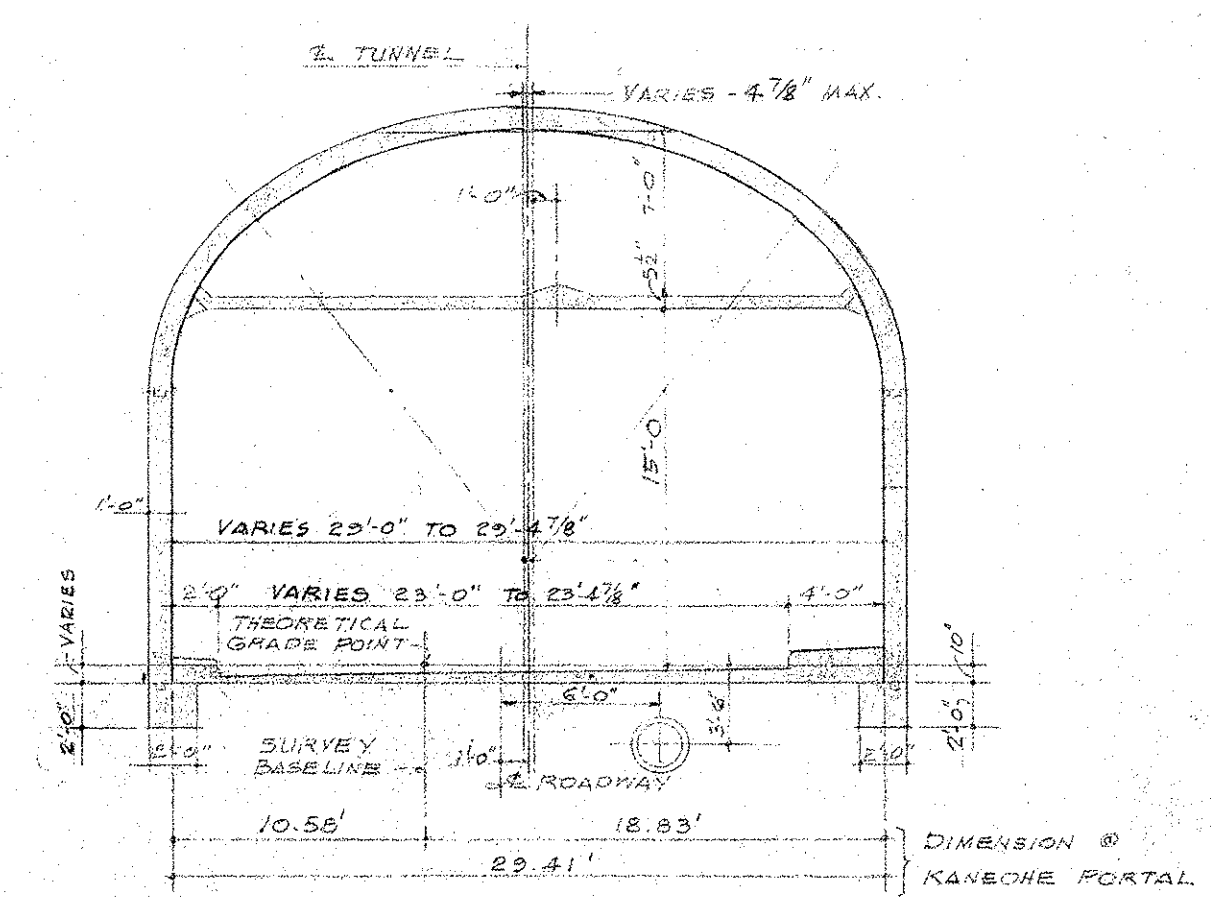
**TUNNEL PROFILE**  
SCALE: 1" = 40'



**KALIHI TUNNEL SECTION**



**KANEOHE TUNNEL SECTION**



**KANEOHE TUNNEL SECTION**  
FROM STA. 269+01.54 (KALIHI) TO KANEOHE PORTAL  
WIDTH VARIES  
SEE DWG NO. X-8

**SCHEMATIC TUNNEL SECTIONS**  
SCALE: 1/8" = 1'-0"

**LAW & WILSON**  
ARCHITECTS & ENGINEERS  
DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS

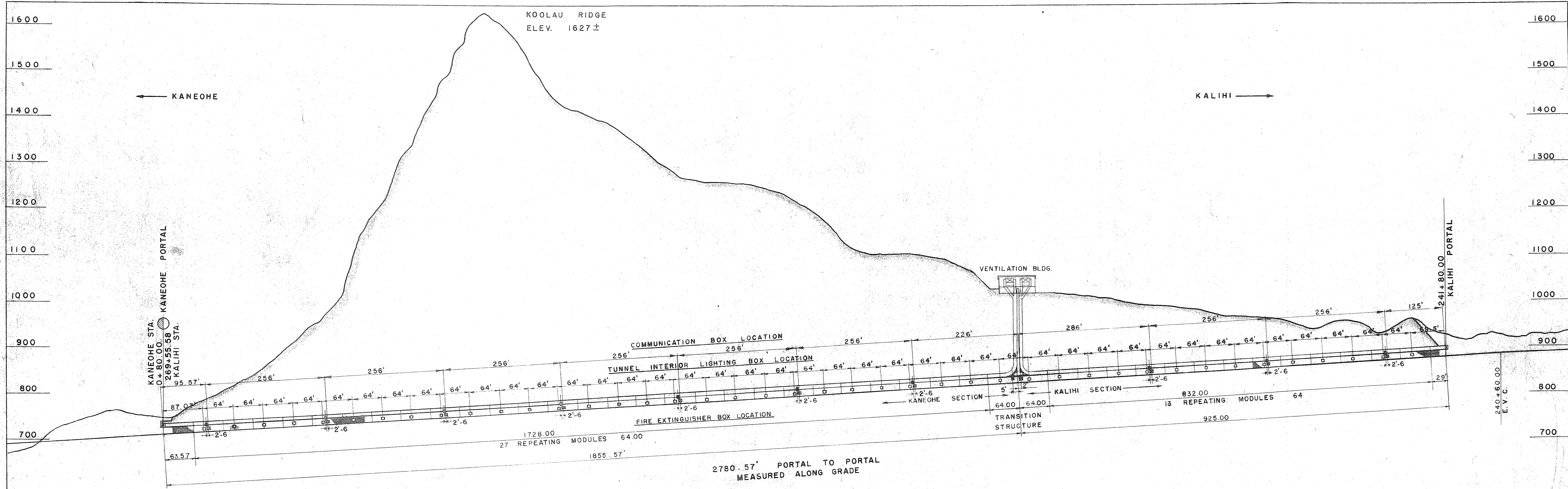
**KALIHI TUNNEL**  
TUNNEL & SHAFT  
SECTIONAL PLAN & PROFILE

ENGINEER: W. Lum DATE: JULY 15, 1953  
DRAFTSMAN: K.N., R.O. CHECKED BY: W. Lum, R.O.  
SCALE: AS NOTED TRACER: K.N.  
APPROVED: R. J. Jannotta, CHIEF ENGINEER  
APPROVED: H. W. Berglund, BUREAU ENGINEER

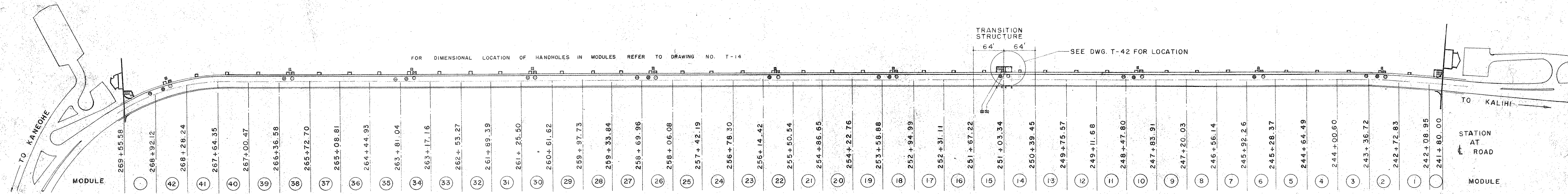
APPROVED	PROFILE	C. B.
ENGINEER, KALIHI TUNNEL	F. B.	S. B.
W. S.	F. W. BY:	S. BY:
C. B. SEC.		
W. M. BY:		

SECTION C JOB NO. 26-53 DWG. T-2





NOTE:  
REVERSED VIEW DUE TO ELECTRICAL  
BOXES ALL ONE SIDE. (RIGHT SIDE)



- NOTE:
- LOCATIONS OF FIRE EXTINGUISHER STATIONS (SEE DWGS. T-10 & T-11)
  - LOCATIONS OF C&C TUNNEL INTERIOR LIGHTING STATIONS (SEE DRAWINGS T-10 & T-11)
  - LOCATIONS OF C&C TUNNEL COMMUNICATION STATIONS (SEE DRAWINGS T-10 & T-11)
  - TUNNEL INTERIOR LIGHTING BOX (SEE DRAWINGS T-19 & E-8)
  - COMMUNICATION BOX (SEE DRAWINGS T-20 & E-9)
  - C&C HANDHOLE (SEE DRAWINGS T-14 & T-15)
  - MUTUAL TELEPHONE HANDHOLE (SEE DRAWINGS T-14 & T-15)
  - SIGNAL CORPS HANDHOLE (SEE DRAWINGS T-14 & T-15)
  - FIRE EXTINGUISHER BOX (SEE DWG. T-21)

**LAW & WILSON**  
ARCHITECTS & ENGINEERS

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU

**BUREAU OF PLANS**

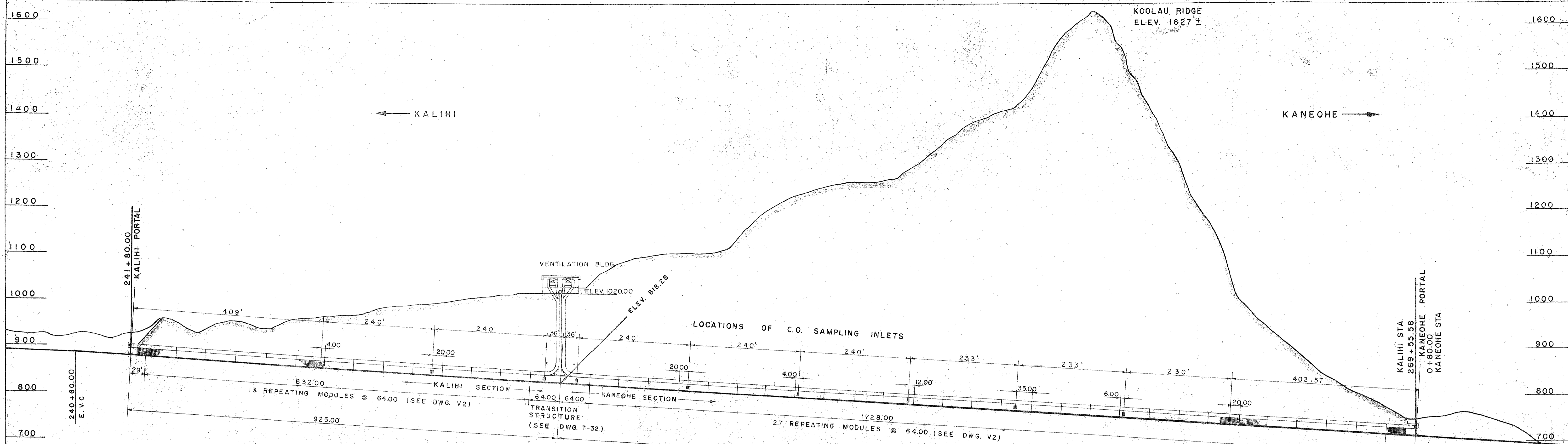
**KALIHI TUNNEL**  
TUNNEL & SHAFT  
KEY PLAN  
ELECTRICAL

ENGINEER: G.B.W. DATE: JULY 1955  
DRAFTSMAN: K.N. CHECKED BY: J.O.  
SCALE: 1" = 100'-0" TRACER:  
APPROVED: *G. B. Wilson* APPROVED: *H. W. Butz*  
CHIEF ENGINEER BUREAU ENGINEER

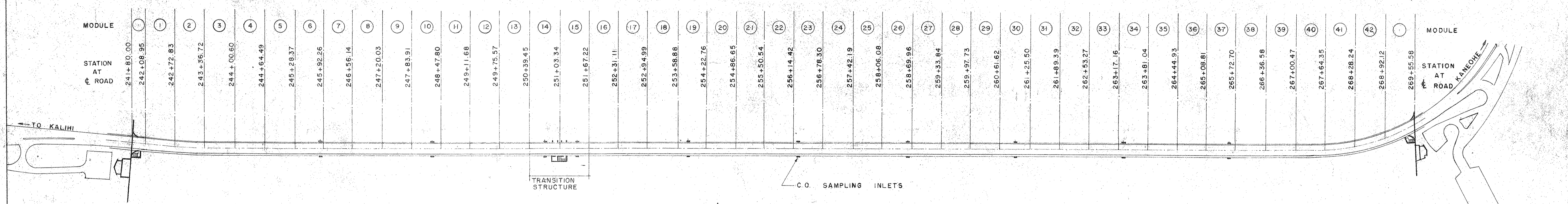
APPROVED:  
*G. B. Wilson*  
ENGINEER, KALIHI TUNNEL

SECTION C JOB NO. 26-53 DWG. T-3





2780.57' PORTAL TO PORTAL  
MEASURED ALONG GRADE  
PROFILE



2775.58' PORTAL TO PORTAL  
HORIZONTAL DISTANCE  
PLAN

- NOTE:
1. VENTILATION EQUIPMENT SAME ON BOTH SIDES OF TUNNEL EXCEPT IN TRANSITION STRUCTURE.
  2. FOR COMPOSITE TRANSVERSE SECTION OF TUNNEL SEE DWG. V-2
  3. FOR DETAIL OF C.O. SAMPLING INLET SEE DWGS. T-22 & V-4
  4. FOR LOCATION OF C.O. SAMPLING BOX SEE DWGS. T-10, T-11.

LAW & WILSON  
ARCHITECTS & ENGINEERS  
DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
BUREAU OF PLANS  
**KALIHI TUNNEL**  
TUNNEL & SHAFT  
KEY PLAN  
C.O. SAMPLING INLET BOXES  
ENGINEER: L. B. W. DATE: JULY 1980  
DRAFTSMAN: K. N. CHECKED BY: E. U.  
SCALE: 1" = 30' TRACER:  
APPROVED: [Signature] APPROVED: [Signature]  
CHIEF ENGINEER BUREAU ENGINEER

APPROVED  
[Signature]  
ENGINEER, KALIHI TUNNEL

W. S.	PROFILE	C. B.
CR. SEC.	F. B.	S. B.
W. M. BY	T. W. BY	S. BY

SECTION C JOB NO. 26-53 DWG. T-4

FILE	POCKET	FOLDER	NO.
7	5	3	4