FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
Hawaii	HAW	S216(4)	1954	3	40

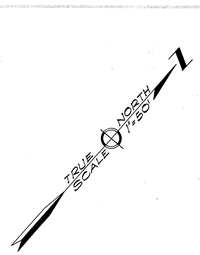
SPILLWAY SUMMARY

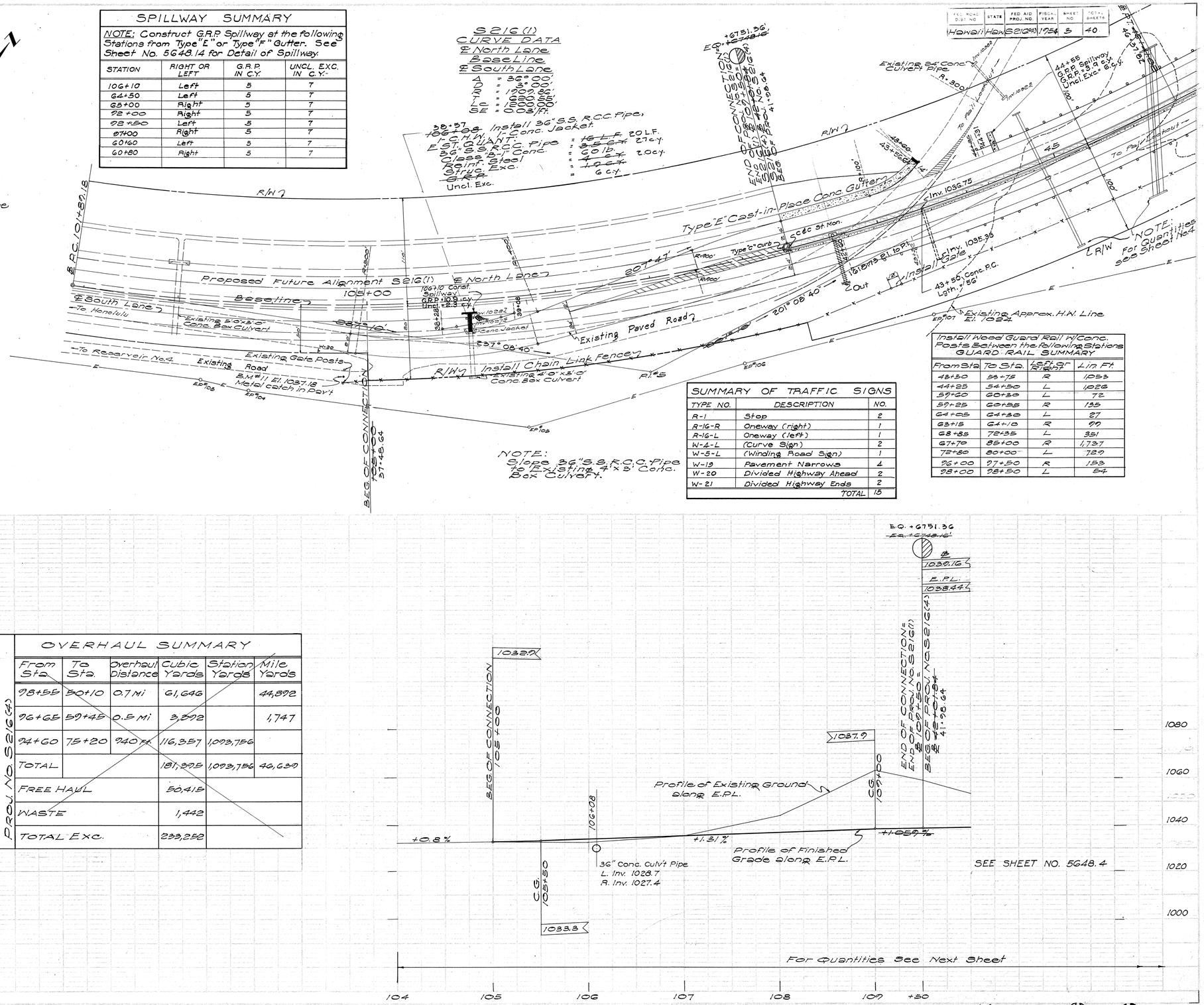
NOTE: Construct G.R.P. Spillway at the following Stations from Type "E" or Type "F" Gutter. See Sheet No. 5G48.14 for Detail of Spillway.

STATION	RIGHT OR LEFT	G.R.P. IN C.Y.	UNCL. EXC. IN C.Y.
106+10	Left	5	7
64+50	Left	5	7
65+00	Right	5	7
92+00	Right	5	7
92+50	Left	5	7
97+00	Right	5	7
60+60	Left	5	7
60+80	Right	5	7

NOTES:

1. The locations and lengths of culverts here shown on these plans are approximate only. The Resident Engineer shall determine the exact locations, invert elevations and grades for each culvert and adjust the quantities for the various items accordingly.
2. All Curbs and Gutters are to be Cast-in-place using Class "A-1" Concrete.
3. All Curbs shall be Type "A" unless otherwise shown.
4. Transitions between various types of curbs and gutters shall be smooth and pleasing to the eye.
5. All ℄ and C&G Standard Street Monuments shall be installed according to the Right-of-Way Maps.
6. All leveling and wearing surfaces shall be of Asphaltic Concrete. See Typical Sections, Sheet 5G48.2.
7. All Azimuths are referred to Kailua Triangulation Station.
8. Datum — Elevation referred to Mean Sea Level.





NOTE: Slope 36" S.S. R.C.C. Pipe to Existing 4'x3' Conc. Box Culvert.

SUMMARY OF TRAFFIC SIGNS

TYPE NO.	DESCRIPTION	NO.
R-1	Stop	2
R-16-R	Oneway (right)	1
R-16-L	Oneway (left)	1
W-4-L	(Curve Sign)	2
W-5-L	(Winding Road Sign)	1
W-19	Pavement Narrows	4
W-20	Divided Highway Ahead	2
W-21	Divided Highway Ends	2
	TOTAL	15

GUARD RAIL SUMMARY

Install Wood Guard Rail w/Conc. Posts Between the Following Stations

From Sta.	To Sta.	Left or Right	Lin Ft.
43+50	55+75	R	1253
44+25	54+50	L	1026
59+60	60+30	L	72
59+25	60+55	R	135
64+05	64+30	L	27
65+15	64+10	R	97
68+85	72+35	L	351
67+70	85+00	R	1737
78+50	80+00	L	729
96+00	97+50	R	153
98+00	98+50	L	54

OVERHAUL SUMMARY

PROJ. NO. S216(4)

From Sta.	To Sta.	Overhaul Distance	Cubic Yards	Station Yards	Mile Yards
98+55	50+10	0.7 Mi	61,646		44,892
96+65	59+45	0.5 Mi	3,592		1,747
94+60	75+20	940 ft.	116,357	1,093,786	
TOTAL			181,595	1,093,786	46,639
FREE HAUL			50,415		
WASTE			1,442		
TOTAL EXC.			233,252		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
Hawaii	HDW	BR216(4)	1964	4	40

S216(1) CURVE DATA
℄ North Lane
Baseline
℄ South Lane
Δ = 56° 00' 00"
T = 1903.00'
D = 1° 00' 00"
R = 5729.58'
L = 2793.00'
E = 155.05'

BEG. PROJECT NO. S216(4)
STA. ~~42+01.84~~ 41+98.64

TRUE SCALE 1"=50'
NORTH

EXISTING PALI ROAD TO PALI LOOKOUT

Existing Box Culvert 2'-0"x2'-0"

Existing Box Culvert 2'-2"x2'-2"

END OF PROJECT S216(1) ~~42+50~~ 41+98.64

41+98.64 - 43+56.64 158 Lin./ft.

Existing 24" Pipe Culvert TO HONOLULU

44+55 G.R.P. Spillway G.R.P. = 3.9 c.y. Uncl. = 6.0 c.y.

46+07 8x4 Box Culvert 163 L.F.
Cl. A-1 Conc. 172.8 c.y.
Str. Exc. 193.0 c.y.
Damp proofing 386.0 s.y.
Reinf. Steel 22,724 lb.
Uncl. Exc. 214 c.y.

48+05.29 ~~48+09.27~~ Install 24" E.S. R.C.C. Pipe W/Conc. Collars, 1-C.H.W., ~~1-Type "B" C.B.~~
EST. QUANT:
24" E.S. R.C.C. Pipe W/Conc. Collars = 48 L.F.
Class "A-1" Conc. = ~~6.0 c.y.~~ 3.2 c.y.
Class "B-1" Conc. = 1.4 c.y.
Reinf. Steel = ~~137 lb.~~ 42 lb.
Struc. Exc. = 16 c.y.
~~G.R.P.~~ = ~~3.8 c.y.~~
~~Type "B" C.I. Frame & Cover = 1~~

52+82 Install 60" E.S. R.C.C. Pipe 2-C.H.W.
EST. QUANT:
60" E.S. R.C.C. Pipe = 152 L.F.
Class "B-1" Conc. = 19.4 c.y.
Reinf. Steel = 192 lb.
Struc. Exc. = 62 c.y.
Uncl. Exc. = 3 c.y.
G.R.P. = 10.4 c.y.

53+00 5x4 Box Culvert 137.5 L.F.
Cl. A-1 Conc. 84.3 c.y.
~~Str. Exc.~~ 193.0 c.y.
Damp proofing 263.0 s.y.
Reinf. Steel 10,625.0 lb.
Uncl. Exc. 588.0 c.y.

53+54 Construct 8'x6' Conc. Box Culvert For Details & Quant. See Sheet No. 5648.15.
Length 172 l.f.
Cl. A-1 Conc. 223.0 c.y.
Str. Exc. 500.0 c.y.
Damp proofing 540.0 s.y.
Reinf. Steel 26,500 lbs.

℄ North Lane
Const. Type "B" Curb
Const. Type "B" Bars
Type "C" Curb
Cast-in-place Conc. Gutter
℄ South Lane
"C&C St. Mon."
Baseline
Const. Type "AG" Curb & Gutter
C&C St. Mon.
Inv. 1036.75
Inv. 1034.5
Inv. 1033.8
Inv. 1039.1
Inv. 1040.0
Inv. 1044.0
Inv. 1042.2
Inv. 1021.5
Inv. 1022.0
Inv. 1027.0
Inv. 1045.5
Inv. 1018.2
Inv. 1011.0
Inv. 1028.0
Inv. 1023.0
Inv. 1016.0
Inv. 1038.33
Inv. 1018.2
Inv. 1028.0
Inv. 1028.2
Inv. 1025.8
Inv. 1030.0
Inv. 1025.8
Inv. 1047.0
Inv. 1045.5
Inv. 1043.9
Exist. Mutual Tel. Cable 2-3½" Transite Ducts
Conc. Jacket
Install Chain Link Fence at 1030± between Sta. 43+50 and Sta. 53+50 See X-Sections.
Install Gate
Exist. approx. high water line Elev. 1024.0
RESERVOIR NO. 4
P.I. #5
SEE SHEET NO. 5648.3
P.I. #6A
P.I. to P.I.
201°08'40"
1618.73
1855.90 S
1873.12 W
245°04'
48+09 G.R.P. Spillway G.R.P. = 5.6 c.y. Uncl. = 7.0 c.y.
48+70 G.R.P. Spillway G.R.P. = 8.9 c.y. Uncl. = 13.2 c.y.
51+50 G.R.P. Spillway G.R.P. = 11.5 c.y. Uncl. = 14.1 c.y.
50+00 G.R.P. Spillway G.R.P. = 3.6 c.y. Uncl. Exc. = 5.4 c.y.

43+50 ~~42+50~~ Install 24" E.S. R.C.C. Pipe W/Conc. Collars, 1-C.H.W., ~~1-Type "C" C.B.~~
EST. QUANT:
24" E.S. R.C.C. Pipe W/Conc. Collars = ~~48 L.F.~~ 64 L.F.
Class "A-1" Conc. = ~~6.6 c.y.~~
Class "B-1" Conc. = ~~1.4 c.y.~~
Reinf. Steel = ~~137 lb.~~
Struc. Exc. = ~~60 c.y.~~ 48.7 c.y.
Uncl. Exc. = ~~16 c.y.~~
G.R.P. = ~~3.8 c.y.~~
~~Type "B" C.I. Frame & Cover = 1~~

44+82 Install 24" E.S. R.C.C. Pipe, 2-C.H.W., ~~1-Conc. Jacket~~
EST. QUANT:
24" E.S. R.C.C. Pipe = ~~160 L.F.~~ 144 L.F.
Class "B-1" Conc. = ~~4.7 c.y.~~ 4.2 c.y.
Reinf. Steel = 84 lb.
Struc. Exc. = ~~39 c.y.~~ 36.0 c.y.
Uncl. Exc. = ~~2 c.y.~~ 13.0 c.y.
~~G.R.P.~~ = ~~3.0 c.y.~~

46+13 Install 2-54" E.S. R.C.C. Pipe, 2-C.H.W.
EST. QUANT:
54" E.S. R.C.C. Pipe 2 x 160 = 320 L.F.
Class "B-1" Conc. = 18.2 c.y.
Reinf. Steel = 258 lb.
Struc. Exc. = 117 c.y.
Uncl. Exc. = 3 c.y.
G.R.P. = 25.6 c.y.

NOTE:
1. See Ft. Chain Link Fence Detail, Sheet 5648.10
2. See Chain Link Gate Detail, Sheet 5648.8

51+80 Install 24" E.S. R.C.C. Pipe W/Conc. Collars, 1-C.H.W., ~~1-Type "B" C.B.~~
EST. QUANT:
24" E.S. R.C.C. Pipe W/Conc. Collars = 48 L.F.
Class "A-1" Conc. = ~~6.0 c.y.~~ 3.2 c.y.
Class "B-1" Conc. = 1.4 c.y.
Reinf. Steel = ~~137 lb.~~ 42 lb.
Struc. Exc. = 16 c.y.
~~G.R.P.~~ = ~~3.8 c.y.~~
~~Type "B" C.I. Frame & Cover = 1~~

55+00 Install 24" E.S. R.C.C. Pipe, 1-C.H.W., ~~1-Type "B" Catch Basin~~
EST. QUANT:
24" E.S. R.C.C. Pipe = 48 L.F.
Class "A-1" Conc. = ~~6.0 c.y.~~ 3.2
Class "B-1" Conc. = 1.4 c.y.
Reinf. Steel = ~~137 lb.~~ 42 lb.
Struc. Exc. = 40 c.y. 8.7
Uncl. Exc. = 24 c.y. 3.2
G.R.P. = 3.8 c.y.
~~Type "B" C.I. Frame & Cover = 1~~

P.I. #6A CURVE DATA
Δ = 43° 55' 20"
Ts = 870.48
Es = 150.3
SE = 0.05'/ft.

Δc = 37° 55' 20"
Dc = 3° 00'
R = 1909.86
T = 656.17
Lc = 1264.07
C = 1241.13

1038.49
~~1039.18~~
1.B. 100+62.84 = P.I. 100+50
E.Q. = ~~1 675 8.18~~ + 6751.36
B.E.G. PROJ. NO. S216(4) ~~41+98.64~~ 41+98.64
1.B. ~~42+05.38~~ 42+02.66
O.B. 100+54.00 = P.I. NO. S216(1) ~~41+07.83~~ 41+94.63
~~42+50~~
43+50
44+82
46+13
48+05.29
51+50
53+54
55+00
1060
1040
1020
+1.1868% ~~+1.059%~~
24" Conc. Culvt Pipe L. Inv. ~~1034.5~~ 1036.75 R. Inv. ~~1033.8~~ 1035.33
+1.1868% ~~+1.059%~~
24" Conc. Culvt Pipe L. Inv. ~~1027.8~~ 1028.0 R. Inv. ~~1012.2~~ 1011.0
8x4 Box Culvert ~~2-54" Conc. Culvt Pipes~~ L. Inv. 1023.0 R. Inv. 1018.2
B.V.C. 46+50
100' V.C.
E.V.C. 47+50
1043.85
~~1045.91~~
℄ 1044.02
℄ 1044.44
C.G. 47+00
Finish Grade at ℄
+0.0554%
24" Conc. Culvt Pipe L. Inv. 1040.0 R. Inv. 1039.1
24" Conc. Culvt Pipe L. Inv. 1044.0 R. Inv. 1042.2
~~60" Conc. Culvt Pipe L. Inv. 1030.0 R. Inv. 1025.8~~
Profile of Existing Ground at Baseline
8x6' Conc. Box Culvt L. Inv. 1027.0 R. Inv. 1021.5
5x4 Box Culvert L. Inv. 1028.0 R. Inv. 1022.0
24" Conc. Culvt Pipe L. Inv. 1047.0 R. Inv. 1045.5

FREEHAUL
EXC. = 16,087 C.Y.
EMB. = 12,974 C.Y.

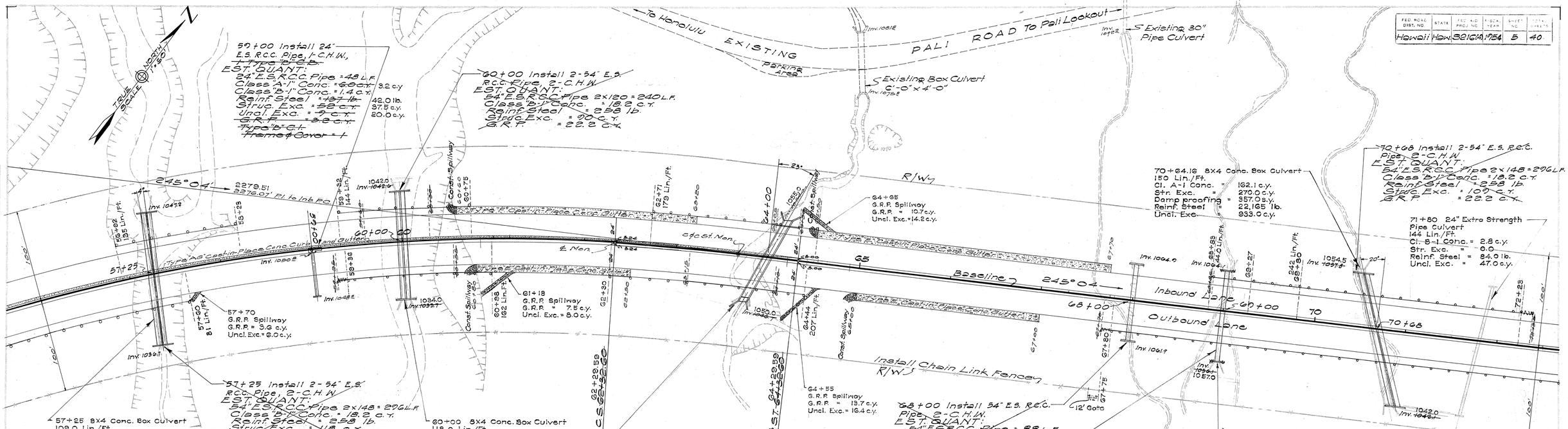
SEE O.H. SUMMARY
EXC. = 60 C.Y.
EMB. = 49,768 C.Y.

FOR QUANTITIES SEE NEXT SHEET

43 44 45 46 47 48 49 50 51 52 53 54 55 56

5648.4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SECTION	SHEET NO.	TOTAL SHEETS
Hawaii	HAW.	S216(4)	1954	5	40


TRUE NORTH
SCALE 1" = 40'
To Honolulu
EXISTING
PALI ROAD To Pali Lookout
Parking Area
Existing 30" Pipe Culvert
Existing Box Culvert 6'-0" x 4'-0"
Inv. 1074.8
Inv. 1081.2
Inv. 1094.2
Inv. 1075.8
50+00 Install 24" E.S. R.C.C. Pipe, 1-C.H.W.
~~1-Pipe 24" B.S.~~
EST. QUANT:
24" E.S.R.C.C. Pipe = 48 L.F.
Class "A-1" Conc. = ~~6.0 c.y.~~ 3.2 c.y.
Class "B-1" Conc. = 1.4 c.y.
Reinf. Steel = ~~187 lb.~~ 42.0 lb.
Struc. Exc. = ~~52 c.y.~~ 37.5 c.y.
Uncl. Exc. = ~~7 c.y.~~ 20.0 c.y.
G.R.P. = ~~3.2 c.y.~~
~~1-Pipe 24" C.I.~~
~~Frame & Cover = 1~~
60+00 Install 2-54" E.S. R.C.C. Pipe, 2-C.H.W.
EST. QUANT:
54" E.S.R.C.C. Pipe 2 x 120 = 240 L.F.
Class "B-1" Conc. = 18.2 c.y.
Reinf. Steel = 2,58 lb.
Struc. Exc. = ~~90 c.y.~~
G.R.P. = 22.2 c.y.
245° 04'
2279.51
2276.07' Pl to Inb Pc
Inv. 1047.2
Inv. 1048.2
Inv. 1048.2
Inv. 1050.5
Inv. 1034.1
Inv. 1034.0
Inv. 1033.7
Inv. 1050.0
Inv. 1033.7
Inv. 1064.9
Inv. 1064.1
Inv. 1061.9
Inv. 1057.0
Inv. 1054.5
Inv. 1054.1
Inv. 1042.0
Inv. 1041.1
Inv. 1010.2
Inv. 1010.2
Inv. 1010.2

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	
Hawaii	HAW.	S216(4)	1984	G	40

NOTE:
Electric poles Nos. 120 to 126 inclusive to be moved by Owners after area is cleared by Contractor.

NORTH 1°30'
TRUE SCALE

74+80 Construct 7'x6' Conc. Box Culvert. For Details and Quantities See Sheet No. 5648.18

77+39.19 8X4 Conc. Box Culvert
147.0 Lin./Ft. 2 Hdwl.
Cl. A-1 Conc. = 149.8 c.y.
Str. Exc. = 137.0 c.y.
Damp proofing = 352.0 s.y.
Reinf. Steel = 21,109 lb.
Uncl. Exc. = 40.0 c.y.

77+50 Install 2-54" E.S. R.C.C. Pipes, 6-C.H.N.
EST. QUANT.
54" E.S. R.C.C. Pipe 2x136 = 272 L.F.
Class B-1 Conc. = 18.2 c.y.
Reinf. Steel = 258 lb.
Struc. Exc. = 56 c.y.
Uncl. Exc. = 88 c.y.
G.R.P. = 42.7 c.y.

(Conn.) 81+00 Construct 12'x8' Conc. Box Culvert. For Details and Quantities See Sheet No. 5648.19
Cl. A-1 Conc. = 332.0 c.y.
Reinf. Steel = 39,510 lb.
Struc. Exc. = 820.0 c.y.
Uncl. Exc. = 42.7 c.y.
Damp proofing = 530.0 s.y.

P.I. A
CURVE DATA
Δ = 63°-22'
Δ/2 = 31°-41'
R = 180'
T = 112.58'
C = 187.57'
L = 199.89'

P.I. 7A & 7C
CURVE DATA
Δ = 10°-27'
D = 0°-40'
R = 8,594.37'
T = 785.03'
C = 1,565.33'
Lc = 1,567.50'
S.E. = 0.015'/Ft.

P.I. B
CURVE DATA
Δ = 16°-13'
Δ/2 = 8°-6'-30"
R = 1000'
T = 142.47'
C = 282.00'
L = 283.03'

11+57 G.R.P. Spillway
G.R.P. = 2.6 c.y.
Uncl. Exc. = 3.0 c.y.

12+85 G.R.P. Spillway
G.R.P. = 4.6 c.y.
Uncl. Exc. = 5.9 c.y.

13+58 G.R.P. Spillway
G.R.P. = 2.8 c.y.
Uncl. Exc. = 3.0 c.y.

14+24 G.R.P. Spillway
G.R.P. = 2.8 c.y.
Uncl. Exc. = 3.0 c.y.

CHANNEL NO. 1
See Sheet No. 5648.21

CHANNEL NO. 2
See Sheet No. 5648.21

88+00 Install 84" E.S. R.C.C. Pipe, 1-C.H.N., 1-C.D.I.
EST. QUANT.
84" E.S. R.C.C. Pipe = 64 L.F. 88 L.F.
Class B-1 Conc. = 2.9 c.y.
Reinf. Steel = 3,042 lb.
Struc. Exc. = 3.0 c.y.
Uncl. Exc. = 3.0 c.y.
G.R.P. = 0.9 c.y.

G.R.P. Spillway
G.R.P. = 2.1 c.y.
Uncl. Exc. = 3.0 c.y.

P.I. 7E
CURVE DATA
Δ = 5°-30'
R = 2000'
T = 96.07'
C = 191.91'
Lc = 191.99'
S.E. = 0.05'/Ft.

P.I. "A-1"
CURVE DATA
Δ = 33°-30'
R = 500.00'
T = 150.48'
C = 288.20'
L = 292.34'

74+75 7X6 Conc. Box Culvert
138.0 Lin./Ft.
Cl. A-1 Conc. = 143.7 c.y.
Str. Exc. = 428.0 c.y.
Damp proofing = 403.0 s.y.
Reinf. Steel = 18,278 lb.
Uncl. Exc. = 598.0 c.y.

Edge of existing stream

Baseline
Sta. 77+50
2279.51 P.I. To P.C.
245° 04'
248° 04'
249° 34'
448.92 P.C.T. To P.I.
245° 04'
250° 34'
℄ Inbound
℄ Outbound
℄ Connection
℄ R/W
Note: ℄ Sta. 78+38.62 = End of 4-Lane Highway Section
End of Seg. Seg. of Connection

Inv. 1056.0
Inv. 1062.5
Inv. 1053.0
Inv. 1054.0
Inv. 1061.0
Inv. 1057.5
Inv. 1067.4
Inv. 1066.0
Inv. 1091.0

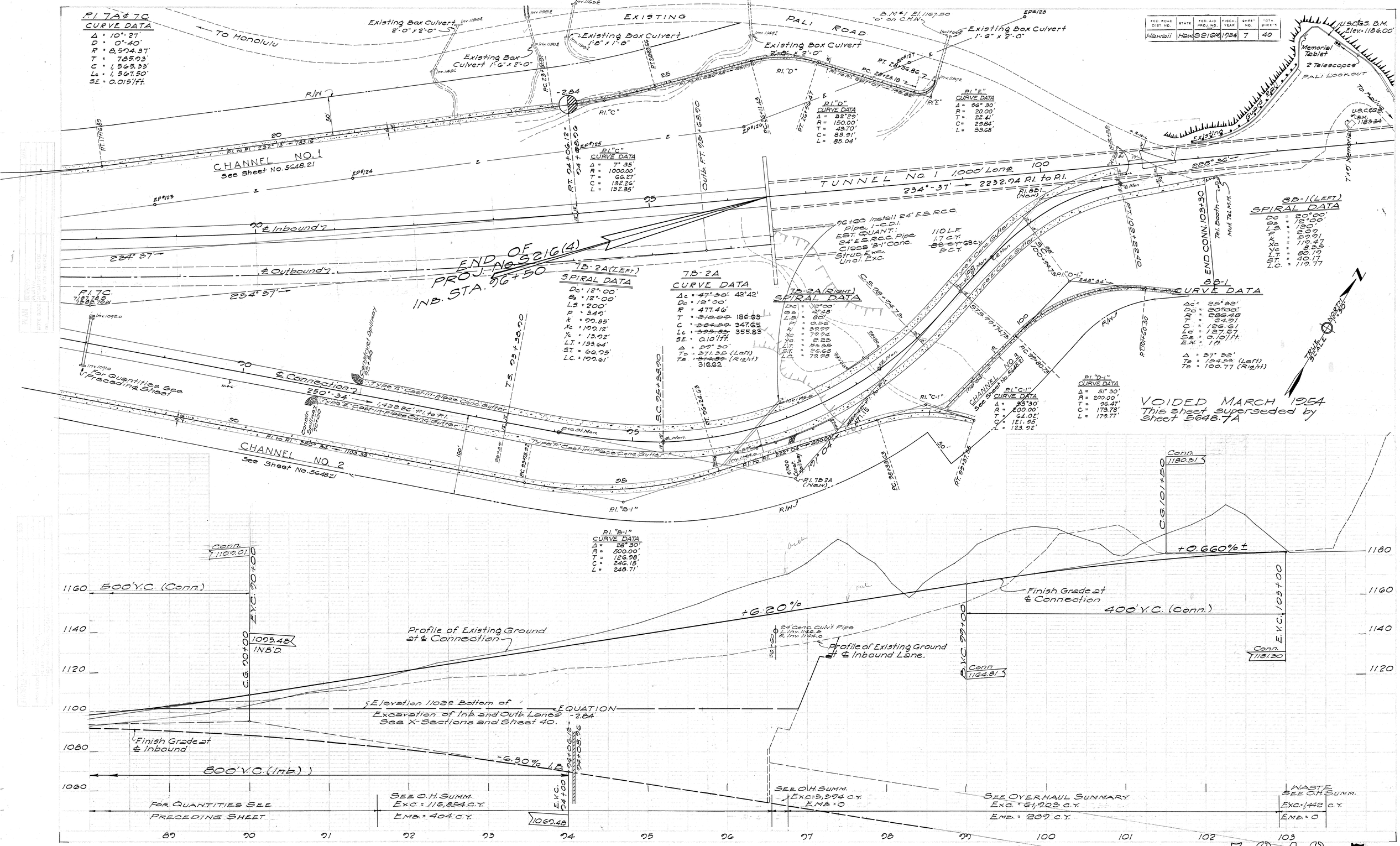
Grade Equation -0.18

Fin. ℄ Grade
+1.87%
+0.7888%
+2.5569
200' V.C.
400' V.C.
800' V.C. (Inb.)
500' V.C. (Conn.)
B.V.C. 73+00
C.G. 74+00
E.V.C. 77+00
P.C. 78+38.62
C.G. 75+00
B.V.C. 79+50
C.G. 81+50
E.V.C. 83+50
B.V.C. 85+00
B.V.C. 86+00
C.G. 87+50
1071.34
1083.04
1077.45
1081.00
1080.82
1088.78
1091.84
1081.17
1083.83
1072.34
1083.07
1090.36
1072.33
1093.15
Conn.
I.B. & Conn.
I.B.
Profile of Existing Ground at Baseline
Profile of Existing Ground at ℄ I.B. Lane
Profile of Existing Ground at ℄ Conn.
Fin. Grade at ℄ I.B. & ℄ Conn.
Note: Grade Control Change at P.C. 78+38.62. Subtract 0.18' from ℄ Grade to obtain ℄ I.B. or ℄ Connection Grades.
7'x6' Conc. Box Culvert
L. Inv. 1062.5 1056.0
R. Inv. 1054.0 1053.0
8'x4' Conc. Box Culvert
L. Inv. 1063.8 1061.0
R. Inv. 1060.0 1057.5
12'x8' Conc. Box Culv't
L. Inv. 1067.4
R. Inv. 1066.0
24" Conc. Culv't Pipe
L. Inv. 1092.0
R. Inv. 1091.0
SEE OVERHAUL SUMMARY
EXC. = 909 c.y.
EMB. = 94,569 c.y.
FREEHAUL
EXC. = 23,931 c.y.
EMB. = 19,301 c.y.

73 74 75 76 77 78 79 80 81 82 83 84 85 86 87

5648.6

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
Hawaii	HAW	S216(4)	1954	7	40



5648.7

This sheet is superseded by sheet 5648.7A

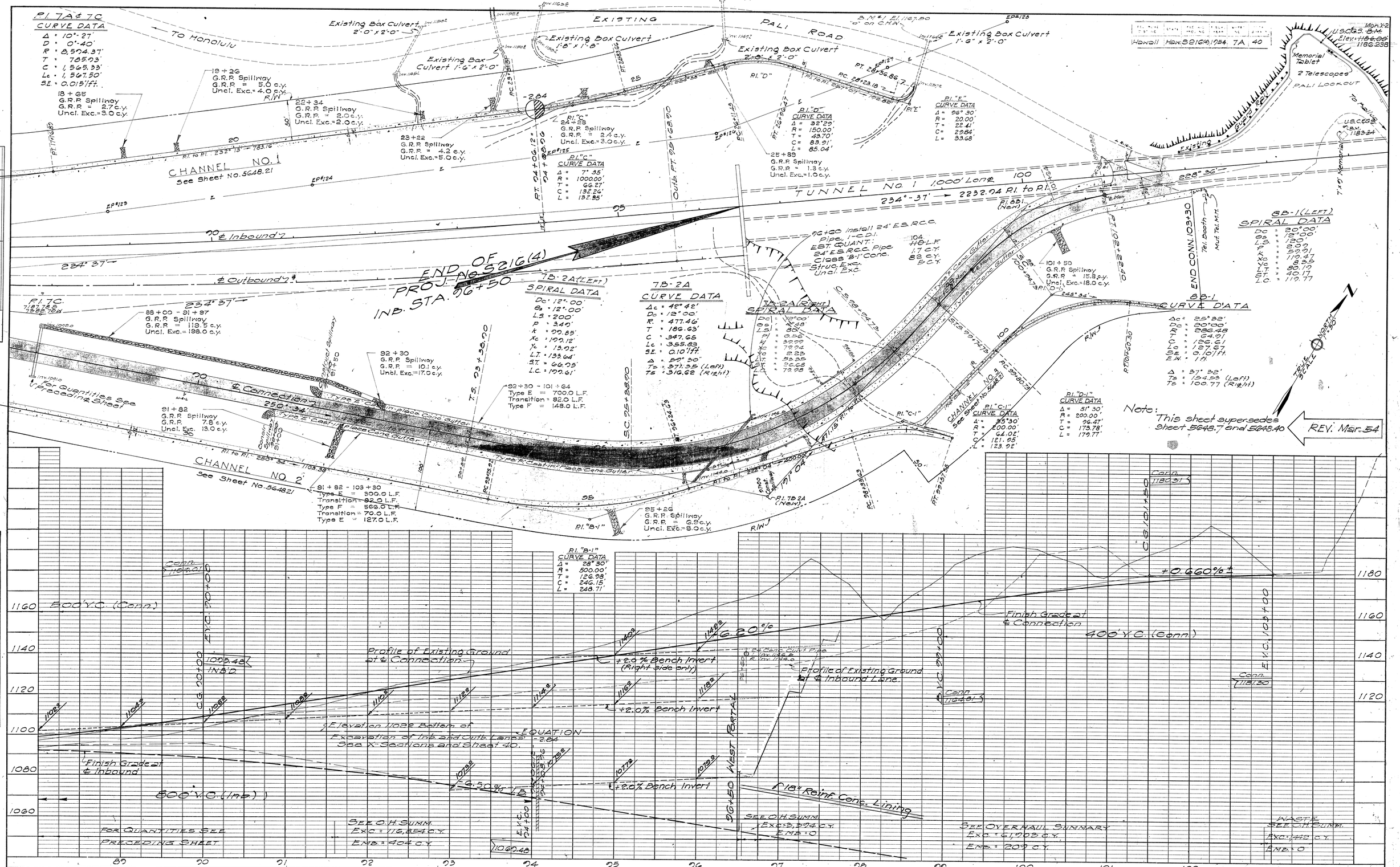


PLATE 1 — PLAN-PROFILE O. P. R. & R. E. STANDARD
KEUFFEL & ESSER CO., NEW YORK.

K & E Co. No. 346-IC
"IMPERIAL" TRACING CLOTH 47633

5648.7A