Revision #1 - 7/63 - Revised Wall Elevations.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	156	217

1st AVE.
HARDING AVE.
R/W Line & Front Face of Wall
Az. 230° 31' 30"
Wingwall #2
Toe of fill
1½:1 Fill Slope
W.P. "B"
℄ Bear. Abut. #3 Az. 230°46'00"
℄ Pier Column Az. 230°46'00"
℄ Bear. Abut. #4 Az. 230°46'00"
℄ Bearing Abut. #4 Sta. 55+33.61
℄ Bearing Abut. #3 Sta. 54+50.61
B.P.T. Sta. 54+05.88
Abutment Wall Type AW-5
Reference front face of wall Type AW-5
5,700 psf Group I
5,900 psf Group I
8,000 psf Group I
7,300 psf Group I
7,400 psf Group I
6,000 psf Group I
INBOUND
OUTBOUND
Edge of Shoulder
Edge P.C.C. Pav't
℄ Freeway Az. 320°46'00"
℄ Pier Col. ① Sta. 54+58.61
Footg. outline
W.P. "A"
Reference Drip Line
Wingwall #1
R/W Line
54+00
55+00
69
70
71
Abutment Wall Type AW-6
Abutment Wall Type AW-5
Abutment Wall Type AW-4
Type X
Type W-R
Top Wall El. 60.85
Top Wall El. 62.96
½" offset for future premolded filler (See Typ. Sect.)
Expansion joint in stem only-similar as shown on Retaining Wall Detail
℄ Pier Column ①
℄ Sta. 54+95
Approx. future fin. grade
4" ∅ drain 10'-0" o.c.
Approx. exist'g. ground line
Inv. El. 37.5
See Det. "X"
Bott. Ftg. El. 28.5
Bott. Ftg. El. 31.5
Bott. Ftg. El. 33.0
20'-0"
22'-0"
17'-9"
23'-3"
REVISION NO. 1
ELEVATION (A/A-1) ABUTMENT TYPE AW-5
Scale: 1" = 10'
Top of col. Elev. 57.38
~~Exact elevation to be determined in field by the Engineer.~~
Reference: Front face of abutment wall Type AW-5
½" offset (Future premold filler)
37-#4 col. bars
#5 cl. ties thruout
Column size see Sect. (C/A-1)
½" Open Joint
Reference: Top of Ftg.
4-#11 x 6'-0" Dowels
See Typ Hinge Det. (B/A-1)
COLUMN ① DETAIL
Scale: ¼" = 1'-0"
½" premolded filler between column & footing-shape as req'd.
30" Dia. Key
Vert col. bars. See Sect.
#5 cl. ties See Col. Detail for spc'g.
Finish smooth, coat with bond breaking material between ftg. and column hinge.
#11 dowels
TYPICAL HINGE DETAIL (B/A-1)
Scale: ⅜" = 1'-0"
30" dia. x 2" deep key
Vert. column bars-see Sec.
Triple #5 cl. ties ea. spacing thruout see Column Detail for spacing
4-#11 x 6'-0" long dowels located as shown & 30" dia. key
TYPICAL COLUMN SECTION (C/A-1)
Scale: ⅜" = 1'-0"
½" offset for future premolded filler
Reference front face of wall AW-5
Top of wall Elevation See Elev.
2" x 4" cont. key
2-#5 cont. top
#4 @ 12
batter - see corresponding wall type
Kicky as required
Abutment wall AW-5 reinf. - for type & extent see Elevation
½" Open Joint
TYPICAL SECTION (D/A-1) (Abut. Wall Type AW-5)
Scale: ½" = 1'-0"
Outline future abut. stem & approach slab
Untreated base
Select Borrow Subbase
12" Filter material cont. horiz. thruout
Cont. ditch around abut. See Hwy. Drwg. for limits
4" ∅ Tile drain See Reference Notes
Approx. existing ground line
2'-0" min. continuous impervious material as selected by the engineer.
Bot. Ftg. El. 32.00
Future finish grade
Structural backfill thruout
AT ABUTMENT WALL TYPE AW-2, AW-3, AW-4, AW-6, AW-7
Structural backfill
Where counterfort occurs
Existing ground line
AT ABUTMENT WALL TYPE AW-1 (ABUTMENT WALL TYPE AW-2 SIMILAR)
#10 @ 5 stem reinf.
5-#10 x 6'-0" lg. added
2-#7 x 7'-0" lg. added
2-#4 x 4'-6" lg. Diag. added ea. face ea. side
DETAIL "X"
Scale: ⅜" = 1'-0"
24" P.C.C.P. - 36.87%
Inv. El. 37.5
Top Ftg. El. 34.0
SECTION A-A
Scale: ⅜" = 1'-0"
Hatched areas denote limits of structural excavation paylines
Excavate & pour to neat lines at front face & bott. of Ftg.
TYPICAL LIMITS of ABUTMENT STRUCTURAL EXCAVATION PAYLINE
No Scale

Note: For Abutment Wall Type AW-5 reinforcing and detail, refer to Type "T-1" Retaining Wall Standard Sht. #180

Note: For additional reinf. see Ret. Wall Std. sht. #180

REFERENCE NOTE:

1. For additional General Notes see sht. #173
2. To suit future finish grading of areas at structure - see Highway Drawing for exact invert elevation of tile drains in abutments and Retaining Walls.

TYPICAL LIMITS of ABUTMENT EXCAVATION BACKFILL

No Scale

ESTIMATED QUANTITIES

Class A-1 Concrete	Lump Sum	1,501 (~~1,471~~	c.y.)
Reinforcing Steel	Lump Sum	(~~178,628~~	lbs) 181,628
Structural Excavation		2,937	c.y.
Filter Material		244	c.y.

LAYOUT PLAN

Scale: 1" = 20'-0"

Boring Nº 69
℄ 54+48 · 52'L

Elev.	
40.1	
38.6	Brown soil
28.6	Hard cracked rock

Boring Nº 70
℄ 54+48 · on ℄

Elev.	
37.9	Loose rocks, brown soil & boulders
32.9	Loose rocks with brown soil
29.9	Hard cracked rock
19.9	

Boring Nº 71
℄ 54+50 · 83'R

Elev.	
32.8	Loose rock & Boulders
27.8	Brown soil
25.8	Boulders
21.8	Loose cracked rock
11.8	Hard cracked rock
1.8	

LOG of BORINGS

Scale: 1" = 20'

⊗ Indicates borings shown on this sheet.

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY .... DATE
DRAWN BY G.T. "
TRACED BY "
DESIGNED BY H.N. "
QUANTITIES BY J.F. H.N. "
CHECKED BY P. Yamashita J.T.O. "

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE Nº 3
ABUTMENT Nº's 3 & 4
℄ Sta. 54+50.61 & 55+33.61

Lunalilo Freeway
Project Nº I-HI-1(4):24

SHEET No. A-1 OF SHEETS

Revision #1 - 7/63 - Revised Wall Elevations.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	157	217

ABUTMENT ELEVATION (A/A-2) Scale: 3/16" = 1'-0"

SECTION (B/A-2) No Scale

SECTION (C/A-2) No Scale

SECTION (E/A-2) No Scale

ABUTMENT DETAIL (D/A-2) Scale: 3/8" = 1'-0"

PLAN - ABUTMENT No 3 Scale: 3/16" = 1'-0"

Top Stem El. 62.96
CL Freeway
6'-0"
B/A-2
1/2" premolded joint filler in stem
Outline future abutment stem extension
Top Stem El. 60.31
Top Abutment Wall El. 62.12
Top of column El. ~~57.00~~ ±57.38 Exact elevation to be determined in the field by the Engineer
Top conc. seat El. 58.58
Top conc. seat El. 58.40
Top conc. seat El. 58.20
Top conc. seat El. 58.00
Top conc. seat El. 57.81
Top conc. seat El. 57.61
Top conc. seat El. 57.41
Top conc. seat El. 57.21
Top conc. seat El. 57.02
Top conc. seat El. 56.82
Top conc. seat El. 56.62
Top conc. seat El. 56.43
Top conc. seat El. 56.23
Top conc. seat El. 56.09
Top conc. seat El. 55.95
Top conc. shelf @ CL Bearing El. ~~56.75~~ 58.33
Top conc. shelf @ CL Bearing El. 55.70
B/A-5
C/A-5
C/A-2
C/A-4
E/A-2
B/A-4
Expansion joint in wall only - similar as shown on Typical Retaining Wall Det. See Elev. B/A-2
Bal.-Abutment Wall Type AW-4
25'-0" Abutment Wall Type AW-3
Abutment Wall Type AW-1
Approx. existing ground line
Approximate future finish grade line
4" dia. tile drain in wall @ 10'-0" o.c. - exact location to be determined in field by Engr. to suit finish grade line.
Bot. Footing El. 32.00
5'-6"
2'-6"
Bottom Footing El. 33.00
Bottom Footing El. 30.00
1'-0" footing step - see Typical Retaining Wall Standard
1'-0" footing step see Typical Retaining Wall Det.
Bottom Footing El. 22.50
AW-3
AW-1
6'-0" to CL
1/2" premolded filler
Flashing compound
Premolded filler indicated by hatched area.
2" x 4" cont. key thruout to top of footing
Expansion joint detail - see Typical Retaining Wall Det. Sht. # 180
Flashing compound
REVISION NO. 1
CL Counterfort CF-3
Abutment Wall Type AW-2
1'-3"
45°
5'-0"
1'-6"
1'-5 1/2"
1/2"
2'-3"
1'-3"
4'-9 3/4"
Shelf drain
4" φ tile drain
P.I. front face of abut. stem & W.P. "A"
CL Bearing Abut. #3
2'-6 3/4"
3" drip
74'-9" to CL
E/A-5
17'-0"
15'-0"
48'-0"
Wingwall #1
16'-0"
10'-4"
38° 55' 30"
Outline end of future alum. railing end post
Reference drip line
Working Point P.I. Drip Line
A/A-1
See Elevation for Type & extent
9'-0"
42'-0 1/4"
74'-9"
Reference front face of wall AW-5
5'-0"
4'-0"
10'-9"
5'-0"
5'-9"
12'-9"
12'-9"
12'-9"
12'-9"
CL Counterfort Type CF-1
CL Type CF-1
CL Type CF-1
CL Type CF-1
CL Type CF-1
CL Freeway Az. 320° 46' 00"
44'-0 3/4"
Sta. 54+58.61
2'-0 1/2"
1/2" open jt.
CL Column 1
F/A-5
21'-0"
8'-0"
5'-0"
5'-3"
5'-0"
10'-6"
CL Counterfort Type CF-2
10'-6"
CL Counterfort Type CF-3
4'-0"
14'-0"
25'-3"
7'-3"
W.P. "A"
4" dia. tile drain
CL Bearing Abutment #3 Az. 230° 46' 00"
2'-3"
1'-3"
CL Bearing Sta. 54+50.61
4" dia. tile drain
Reference front face of wall AW-5
Detail D/A-2
E/A-5
Reference front face of wall
A/A-2
5'-0"
7"
6"
7'-11 1/4"
3 spaces @ 8'-6" = 25'-6" CL concrete seat location
8'-0"
6"
8'-6"
6 spaces @ 8'-6" = 51'-0" CL concret seat location
6'-0"
5'-10 1/2"
2'-7 1/2"
3" drip (above)
42'-0 1/4"
74'-9"
32'-0 1/4"
19'-0"
6'-0"
74'-6"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE N° 3
ABUTMENT N° 3
CL Sta. 54 + 50.61

Lunalilo Freeway
Project N° I-H1-1(4):24

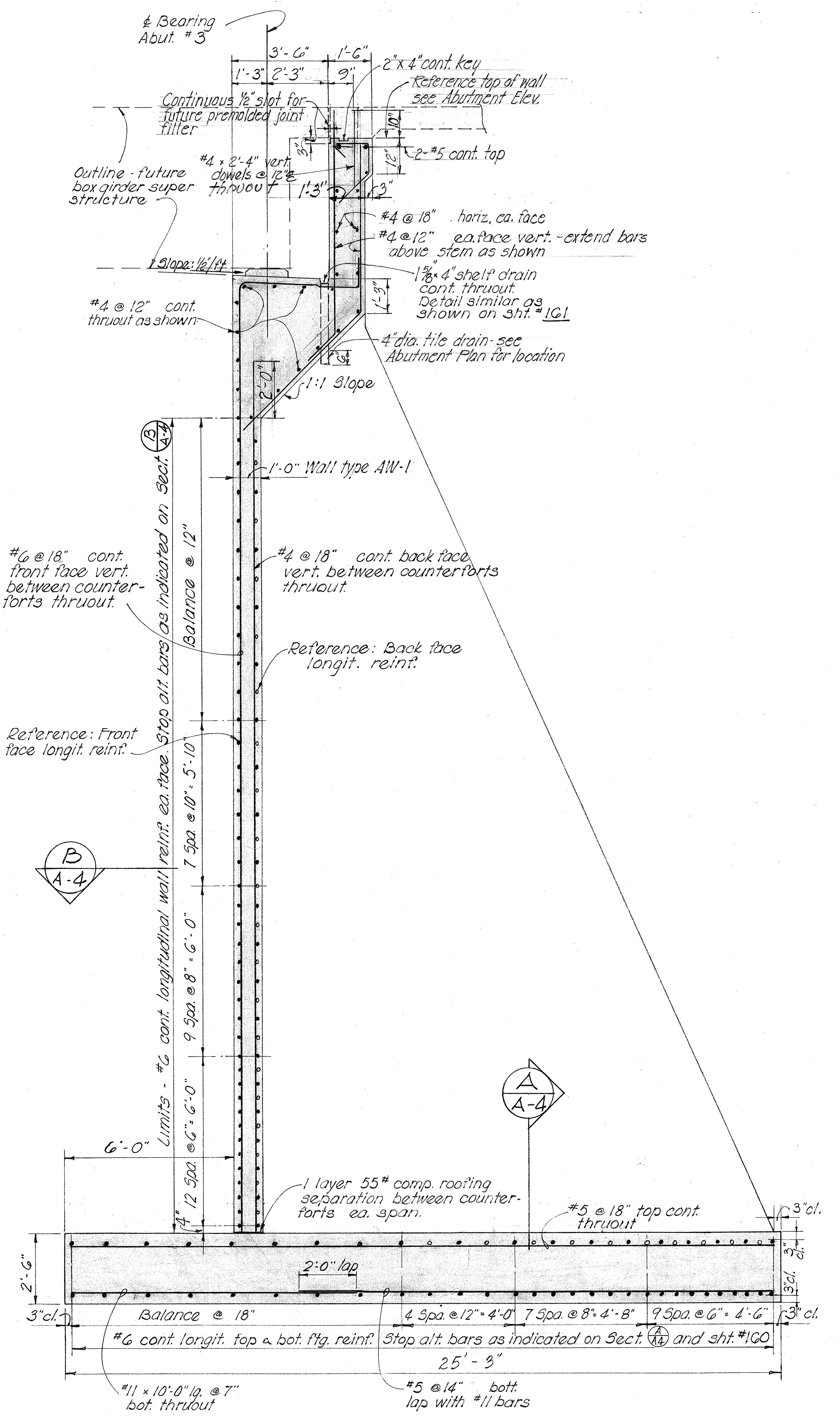
SHEET No. A-2 OF SHEETS

157

ORIGINAL PLAN		DATE
	SURVEY PLOTTED BY	
	DRAWN BY N. Young	"
	TRACED BY Y. Ching	"
NOTE BOOK	DESIGNED BY N.Y. H.M.	" 2-63
	QUANTITIES BY P. Yamashita	"
No.	CHECKED BY J.T.O.	"

Revision #1 - 7/63 - Revised Wall Elevations

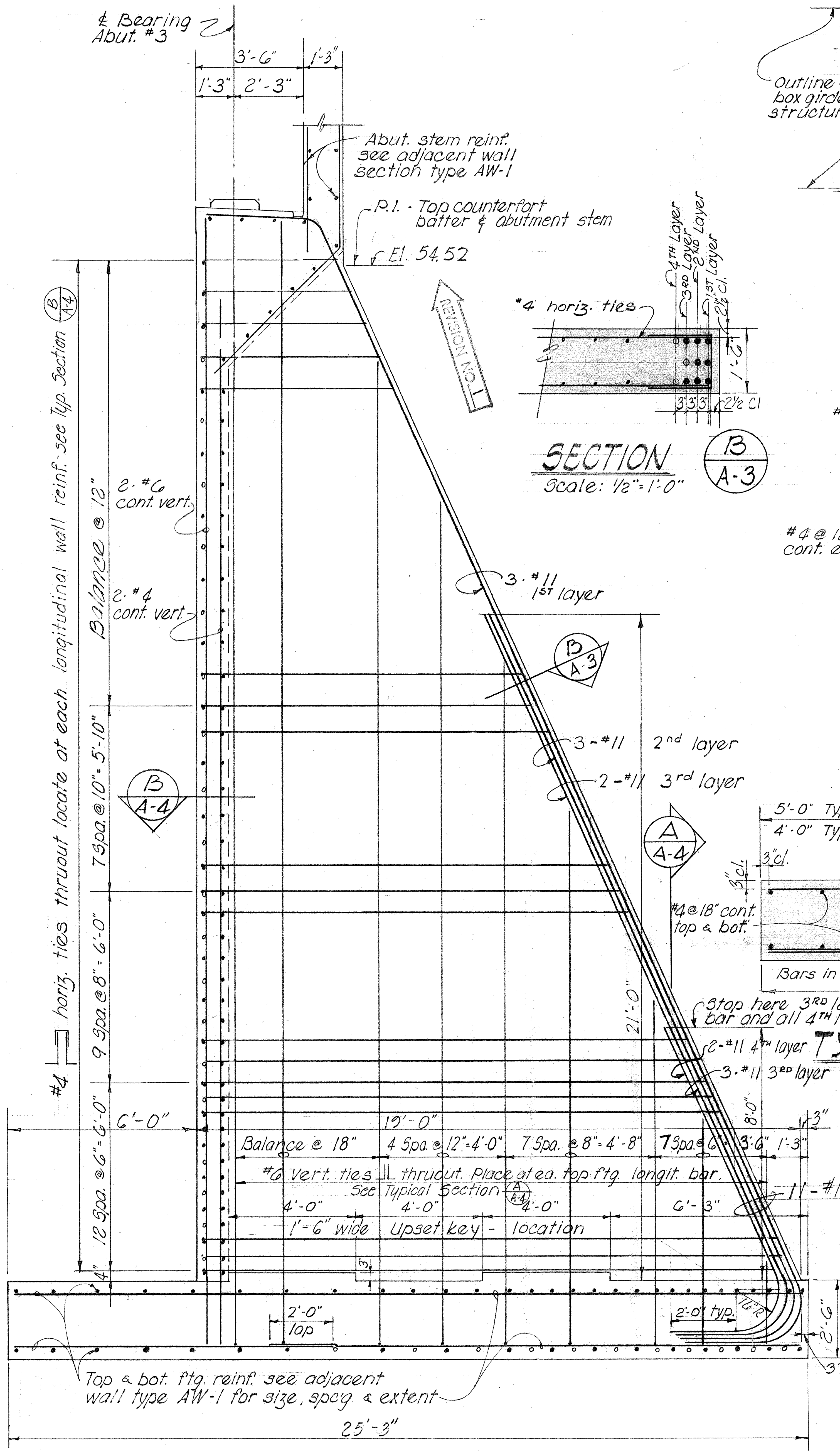
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	158	217



℄ Bearing Abut. #3
3'-6"
1'-6"
1'-3"
2'-3"
9"
2"x 4" cont. key
Reference top of wall see Abutment Elev.
Continuous ½" slot for future premolded joint filler
#4 x 2'-4" vert. dowels @ 12" ℄ thruout
Outline - future box girder super structure
2-#5 cont. top
10"
12"
3"
1'-3"
3"
#4 @ 18" horiz. ea. face
#4 @ 12" ea. face vert. - extend bars above stem as shown
Slope: ½"/ft
1⅝" x 4" shelf drain cont. thruout. Detail similar as shown on sht. #161
1'-3"
#4 @ 12" cont. thruout as shown
4" dia. tile drain - see Abutment Plan for location
6"
2'-0"
1:1 Slope
1'-0" Wall type AW-1
Limits - #6 cont. longitudinal wall reinf. ea. face. Stop alt. bars as indicated on Sect. B/A-4
Balance @ 12"
7 Spa. @ 10" = 5'-10"
9 Spa. @ 8" = 6'-0"
12 Spa. @ 6" = 6'-0"
4"
#6 @ 18" cont. front face vert. between counterforts thruout
#4 @ 18" cont. back face vert. between counterforts thruout
Reference: Back face longit. reinf.
Reference: Front face longit. reinf.
B/A-4
A/A-4
6'-0"
1 layer 55# comp. roofing separation between counterforts ea. span.
#5 @ 18" top cont. thruout
3" cl.
2'-6"
2'-0" lap
3" cl.
Balance @ 18"
4 Spa. @ 12" = 4'-0"
7 Spa. @ 8" = 4'-8"
9 Spa. @ 6" = 4'-6"
#6 cont. longit. top & bot. ftg. reinf. Stop alt. bars as indicated on Sect. A/A4 and sht. #160
25'-3"
#11 x 10'-0" lg. @ 7" bot. thruout
#5 @ 14" bott. lap with #11 bars

TYPICAL SECTION thru ABUTMENT WALL TYPE AW-1

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



℄ Bearing Abut. #3
3'-6"
1'-3"
1'-3"
2'-3"
Abut. stem reinf. see adjacent wall section type AW-1
P.I. - Top counterfort batter & abutment stem
El. 54.52
REVISION No. 1
#4 horiz. ties thruout locate at each longitudinal wall reinf. - see typ. Section B/A-4
Balance @ 12"
7 Spa. @ 10" = 5'-10"
9 Spa. @ 8" = 6'-0"
12 Spa. @ 6" = 6'-0"
2-#6 cont. vert.
2-#4 cont. vert.
B/A-4
3-#11 1st layer
B/A-3
3-#11 2nd layer
2-#11 3rd layer
A/A-4
21'-0"
Stop here 3rd layer center bar and all 4th layer bars.
2-#11 4th layer
3-#11 3rd layer
8'-0"
6'-0"
19'-0"
Balance @ 18"
4 Spa. @ 12" = 4'-0"
7 Spa. @ 8" = 4'-8"
7 Spa. @ 6" = 3'-6"
1'-3"
3"
#6 Vert. ties thruout. Place at ea. top ftg. longit. bar. See Typical Section A/A-4
4'-0"
4'-0"
4'-0"
6'-3"
11-#11
1'-6" wide Upset key - location
3"
4"
2'-0" lap
2'-0" typ.
16" R
2'-6"
3" cl.
Top & bot. ftg. reinf. see adjacent wall type AW-1 for size, spc'g & extent
25'-3"

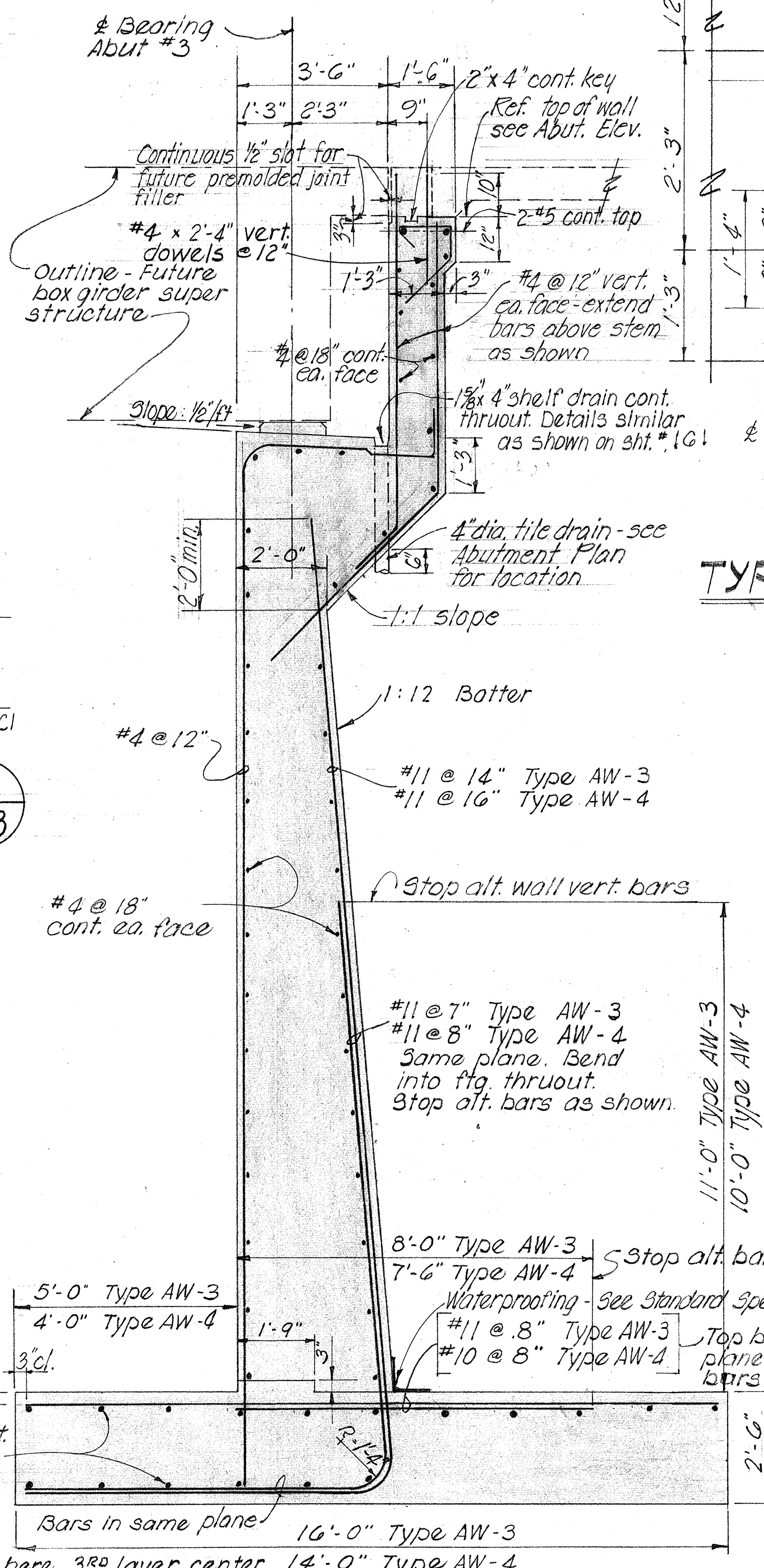
TYPICAL COUNTERFORT TYPE CF-1 DETAIL

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

#4 horiz. ties
4th Layer
3rd Layer
2nd Layer
1st Layer
2½" Cl.
1'-6"
3"
3"
3"
2½ Cl

SECTION B/A-3

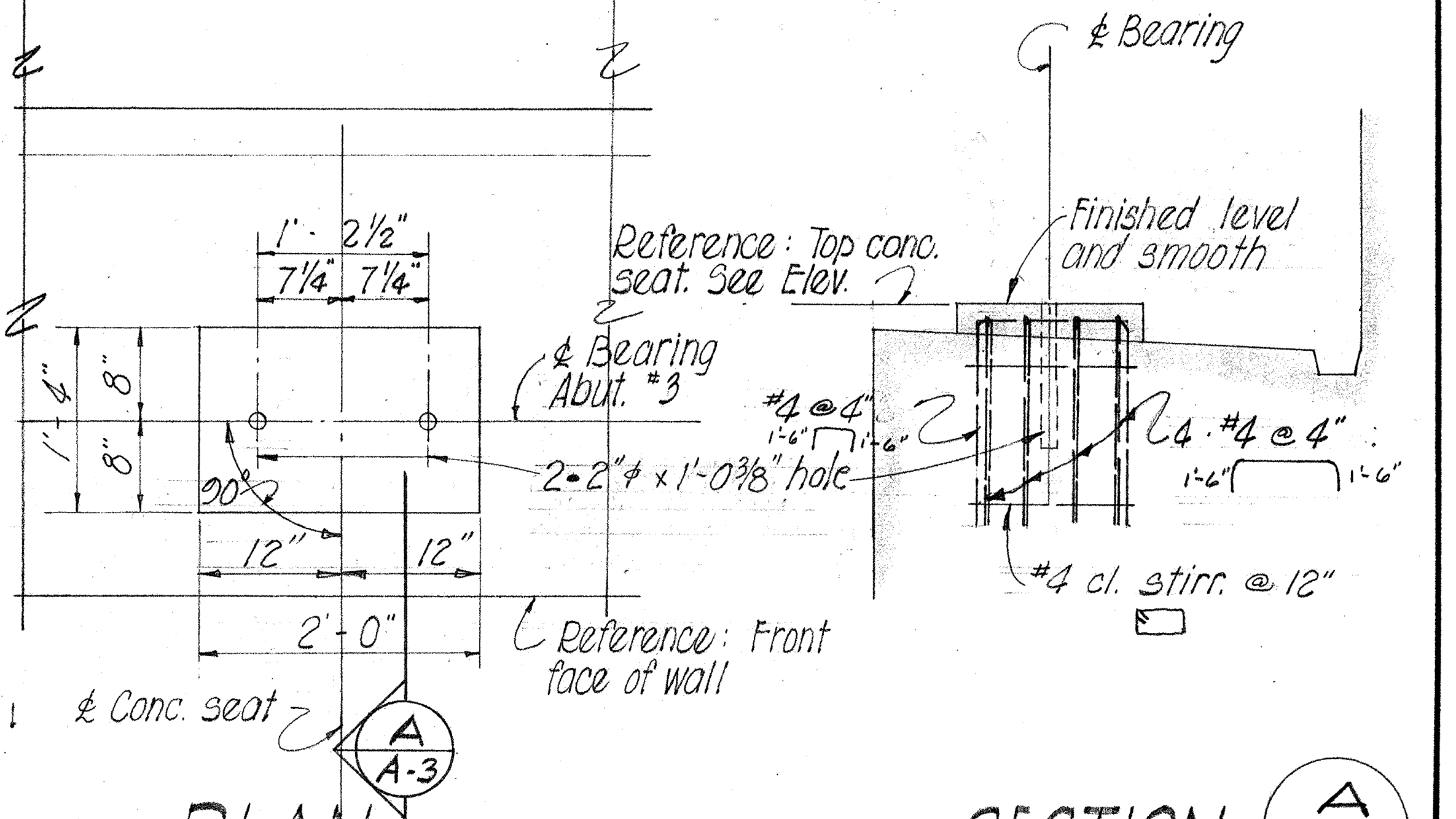
Scale: ½" = 1'-0"



℄ Bearing Abut #3
3'-6"
1'-6"
1'-3"
2'-3"
9"
2"x 4" cont. key
Ref. top of wall see Abut. Elev.
Continuous ½" slot for future premolded joint filler
#4 x 2'-4" vert. dowels @ 12"
Outline - Future box girder super structure
2-#5 cont. top
10"
12"
3"
1'-3"
3"
#4 @ 12" vert. ea. face - extend bars above stem as shown
#4 @ 18" cont. ea. face
Slope: ½"/ft
1⅝" x 4" shelf drain cont. thruout. Details similar as shown on sht. #161
1'-3"
2'-0" min.
2'-0"
4" dia. tile drain - see Abutment Plan for location
6"
1:1 slope
1:12 Batter
#4 @ 12"
#11 @ 14" Type AW-3
#11 @ 16" Type AW-4
Stop alt. wall vert. bars
#4 @ 18" cont. ea. face
#11 @ 7" Type AW-3
#11 @ 8" Type AW-4
Same plane. Bend into ftg. thruout. Stop alt. bars as shown.
11'-0" Type AW-3
10'-0" Type AW-4
8'-0" Type AW-3
7'-6" Type AW-4
Stop alt. bars
5'-0" Type AW-3
4'-0" Type AW-4
Waterproofing - See Standard Specification
1'-9"
3"
#11 @ 8" Type AW-3
#10 @ 8" Type AW-4
Top bars same plane. Stop alt. bars as shown
3" cl.
3" cl.
#4 @ 18" cont. top & bot.
R=1'-4"
2'-6"
Bars in same plane
16'-0" Type AW-3
14'-0" Type AW-4

TYPICAL SECTION thru ABUT. WALL TYPE "AW-3" and "AW-4"

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



12"
2'-3"
1'-3"
1'-2½"
7¼"
7¼"
Reference: Top conc. seat. See Elev.
℄ Bearing Abut. #3
1'-4"
8"
8"
90°
12"
12"
2'-0"
2-2"φ x 1'-0⅜" hole
Reference: Front face of wall
℄ Conc. seat
A/A-3
PLAN
℄ Bearing
Finished level and smooth
#4 @ 4"
1'-6"
1'-6"
4-#4 @ 4"
1'-6"
1'-6"
#4 cl. stirr. @ 12"
SECTION A/A-3

TYPICAL CONC. SEAT DETAIL - ABUT. #3

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE No. 3
ABUTMENT No. 3
℄ Sta. 54 + 50.61

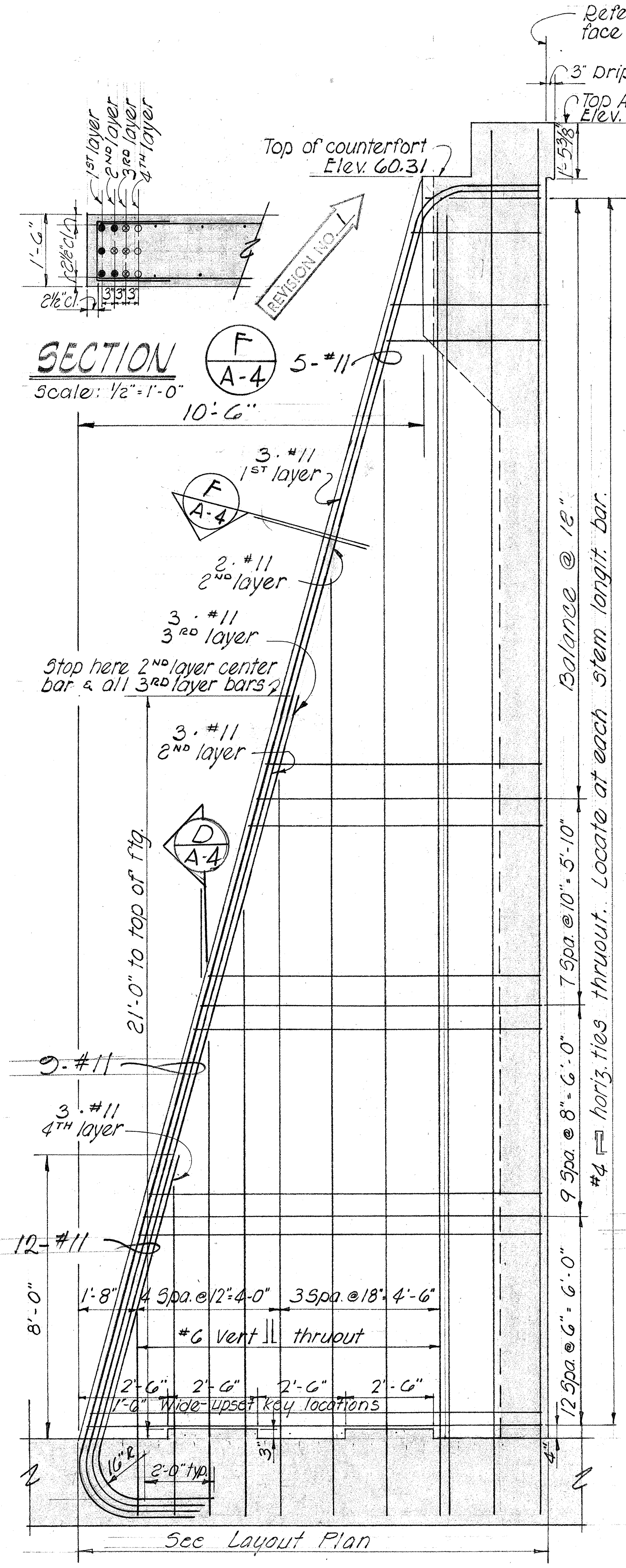
Lunalilo Freeway
Project No I-H1-1(4):24

SHEET No. A-3 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY H. Mizomi	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY V. Ching	" 2-63
	QUANTITIES BY H. M. N.Y.	"
No.	CHECKED BY P. Yamashita J.T.O.	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	159	217

Revision #1 - 7/63 - Revised Wall Elevations



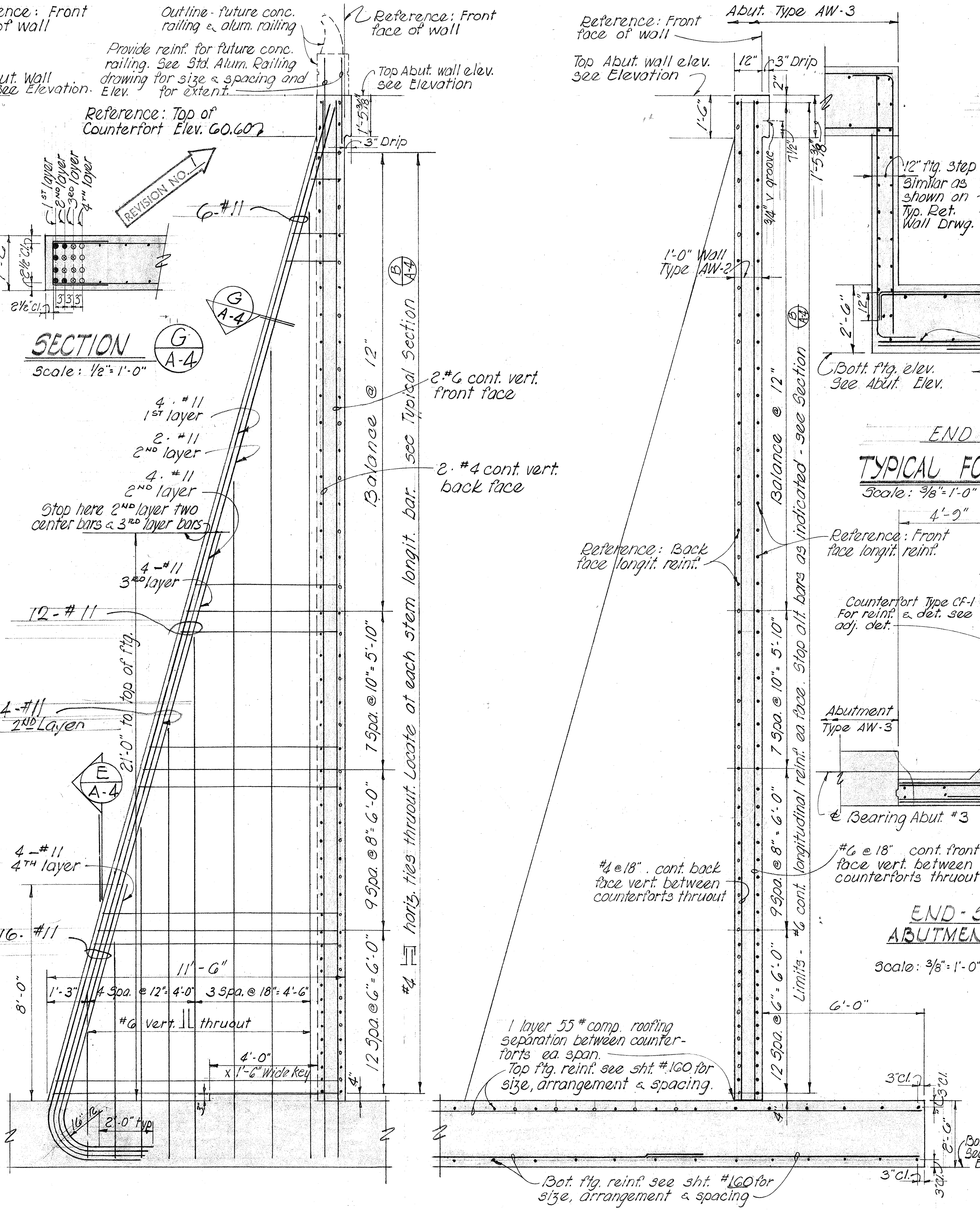
Reference: Front face of wall
3" Drip
Top Abut. Wall Elev. See Elevation
Top of counterfort Elev. 60.31
REVISION NO. 1
1st layer
2nd layer
3rd layer
4th layer
5-#11
10'-6"
3-#11 1st layer
2-#11 2nd layer
3-#11 3rd layer
Stop here 2nd layer center bar & all 3rd layer bars
3-#11 2nd layer
21'-0" to top of ftg.
9-#11
3-#11 4th layer
12-#11
8'-0"
Balance @ 12"
7 Spa. @ 10" = 5'-10"
9 Spa. @ 8" = 6'-0"
12 Spa. @ 6" = 6'-0"
#4 horiz. ties thruout. Locate at each stem longit. bar.
1'-8"
4 Spa. @ 12" = 4'-0"
3 Spa. @ 18" = 4'-6"
#6 Vert. thruout
2'-6"
1'-6" Wide-upset key locations
2'-0" typ.
16"R
See Layout Plan

SECTION (F/A-4)

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

DETAIL - COUNTERFORT TYPE CF-3

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



Outline - future conc. railing & alum. railing
Provide reinf. for future conc. railing. See Std. Alum. Railing drawing for size & spacing and for extent.
Reference: Front face of wall
Top Abut. wall elev. see Elevation
Reference: Top of Counterfort Elev. 60.60
3" Drip
REVISION NO. 1
1st layer
2nd layer
3rd layer
4th layer
6-#11
4-#11 1st layer
2-#11 2nd layer
4-#11 2nd layer
Stop here 2nd layer two center bars & 3rd layer bars
4-#11 3rd layer
12-#11
4-#11 2nd layer
21'-0" to top of ftg.
4-#11 4th layer
16-#11
8'-0"
11'-6"
1'-3"
4 Spa. @ 12" = 4'-0"
3 Spa. @ 18" = 4'-6"
#6 vert. thruout
4'-0"
1'-6" Wide key
2'-0" typ.
16"R
Balance @ 12"
7 Spa. @ 10" = 5'-10"
9 Spa. @ 8" = 6'-0"
12 Spa. @ 6" = 6'-0"
#4 horiz. ties thruout. Locate at each stem longit. bar. See Typical Section (B/A-4)
2-#6 cont. vert. front face
2-#4 cont. vert. back face
Reference: Front face of wall
Abut. Type AW-3
Top Abut. wall elev. See Elevation
12"
3" Drip
1'-6"
12" ftg. step Similar as shown on Typ. Ret. Wall Drwg.
3/4" V groove
1'-5 3/8"
1'-0" Wall Type AW-2
Reference: Back face longit. reinf.
Reference: Front face longit. reinf.
Balance @ 12"
7 Spa. @ 10" = 5'-10"
9 Spa. @ 8" = 6'-0"
12 Spa. @ 6" = 6'-0"
Limits - #4 cont. longitudinal reinf. @ face. Stop alt. bars as indicated - see Section (B/A-4)
#4 @ 18" cont. back face vert. between counterforts thruout
#4 @ 18" cont. front face vert. between counterforts thruout
1 layer 55# comp. roofing separation between counterforts ea. span.
Top ftg. reinf. see sht. #160 for size, arrangement & spacing.
6'-0"
3" cl.
2'-6"
Bott. ftg. elev. See Abut. Elevation
Bot. ftg. reinf. see sht. #160 for size, arrangement & spacing

SECTION (G/A-4)

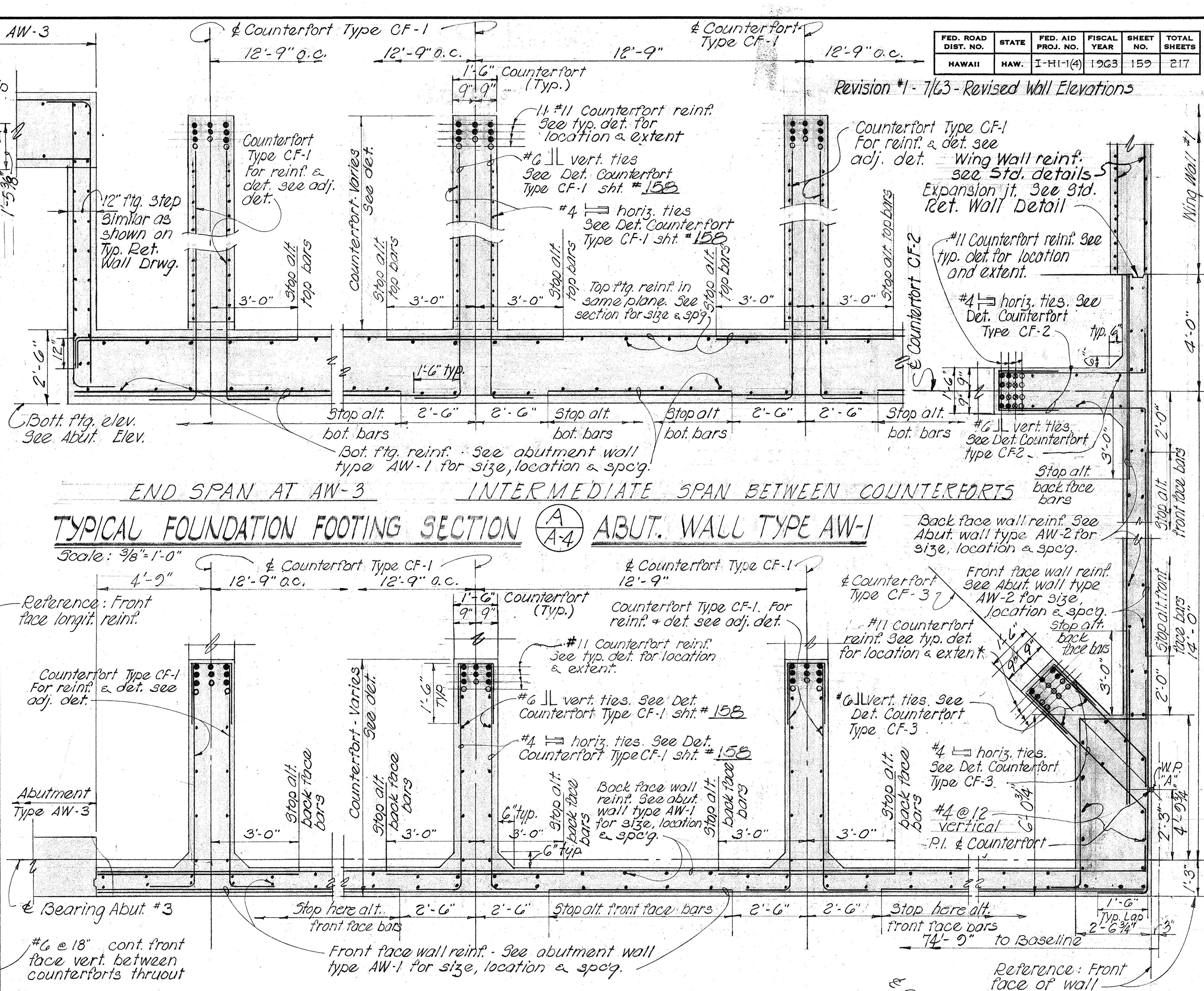
Scale: 1/2" = 1'-0"

DETAIL - COUNTERFORT TYPE CF-2

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

TYPICAL SECT. thru ABUT. WALL TYPE AW-2

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



℄ Counterfort Type CF-1
℄ Counterfort Type CF-1
12'-9" o.c.
12'-9" o.c.
12'-9"
12'-9" o.c.
1'-6" Counterfort (Typ.)
Counterfort Type CF-1 for reinf. & det. see adj. det.
11-#11 Counterfort reinf. See typ. det. for location & extent
#6 vert. ties See Det. Counterfort Type CF-1 sht. #158
#4 horiz. ties See Det. Counterfort Type CF-1 sht. #158
Counterfort varies See det.
Stop alt. top bars
Top ftg. reinf. in same plane. See section for size & spg.
3'-0"
1'-6" typ.
Counterfort Type CF-1 For reinf. & det. see adj. det.
Wing Wall reinf. see Std. details
Expansion jt. See Std. Ret. Wall Detail
Wing Wall #1
℄ Counterfort CF-2
#11 Counterfort reinf. See typ. det. for location and extent.
#4 horiz. ties. See Det. Counterfort Type CF-2
#6 vert. ties See Det. Counterfort Type CF-2
Stop alt. back face bars
Stop alt. front face bars
Bott. ftg. elev. See Abut. Elev.
Stop alt. bot. bars
2'-6"
Bot. ftg. reinf. - See abutment wall type AW-1 for size, location & spg.
END SPAN AT AW-3
INTERMEDIATE SPAN BETWEEN COUNTERFORTS
Back face wall reinf. See Abut. wall type AW-2 for size, location & spcg.
Front face wall reinf. See Abut. wall type AW-2 for size, location & spcg.
℄ Counterfort Type CF-3
#11 Counterfort reinf. See typ. det. for location & extent.
#6 vert. ties. See Det. Counterfort Type CF-3
#4 horiz. ties. See Det. Counterfort Type CF-3.
#4 @ 12 vertical
P.I. ℄ Counterfort
W.P. "A"
4'-0"
2'-0"
4'-9 3/4"
2'-3"
6'-0 3/4"
1'-3"
4'-5"
12'-9" o.c.
Counterfort (Typ.)
Counterfort Type CF-1. For reinf. & det. see adj. det.
#11 Counterfort reinf. See typ. det. for location & extent.
#6 vert. ties. See Det. Counterfort Type CF-1 sht. #158
#4 horiz. ties See Det. Counterfort Type CF-1 sht. #158
Back face wall reinf. See abut. wall type AW-1 for size, location & spcg.
Abutment Type AW-3
6" typ.
Stop alt. back face bars
℄ Bearing Abut. #3
Stop here alt. front face bars
Stop alt. front face bars
Front face wall reinf. - See abutment wall type AW-1 for size, location & spcg.
74'-9" to Baseline
1'-6" Typ. Lap
2'-6 3/4"
3"

TYPICAL FOUNDATION FOOTING SECTION (A/A-4) ABUT. WALL TYPE AW-1

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

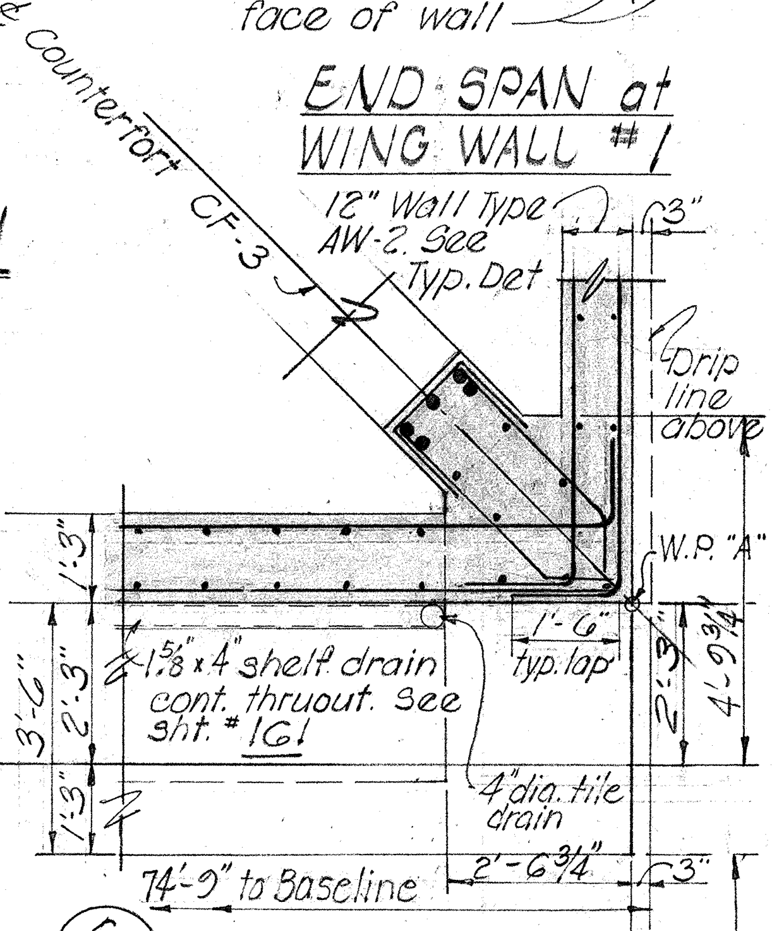
END-SPAN at ABUTMENT WALL TYPE AW-3

INTERMEDIATE SPAN between COUNTERFORTS

END-SPAN at WING WALL #1

TYPICAL SECTION (B/A-4) ABUTMENT WALL TYPE AW-1

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

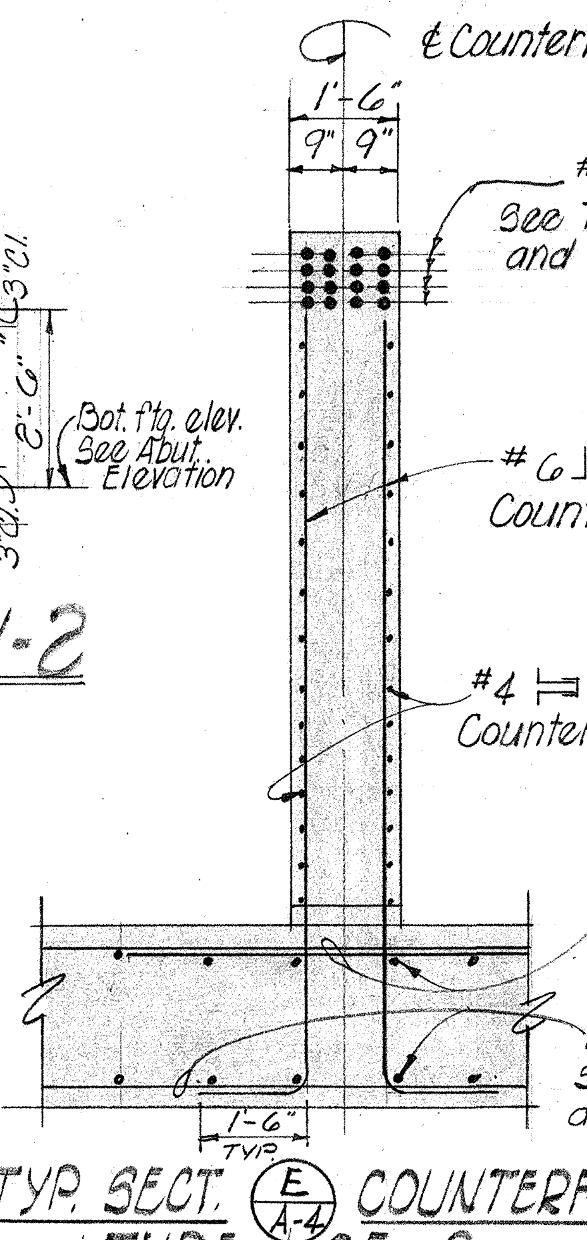


℄ Counterfort CF-3
Reference: Front face of wall
12" Wall Type AW-2 See Typ. Det.
3"
Drip line above
W.P. "A"
1'-6" typ. lap
4'-9 3/4"
1'-1 1/2" x 4" shelf drain cont. thruout. See sht. #161
4" dia. tile drain
3'-6"
1'-3"
2'-6 3/4"
3"
74'-9" to Baseline

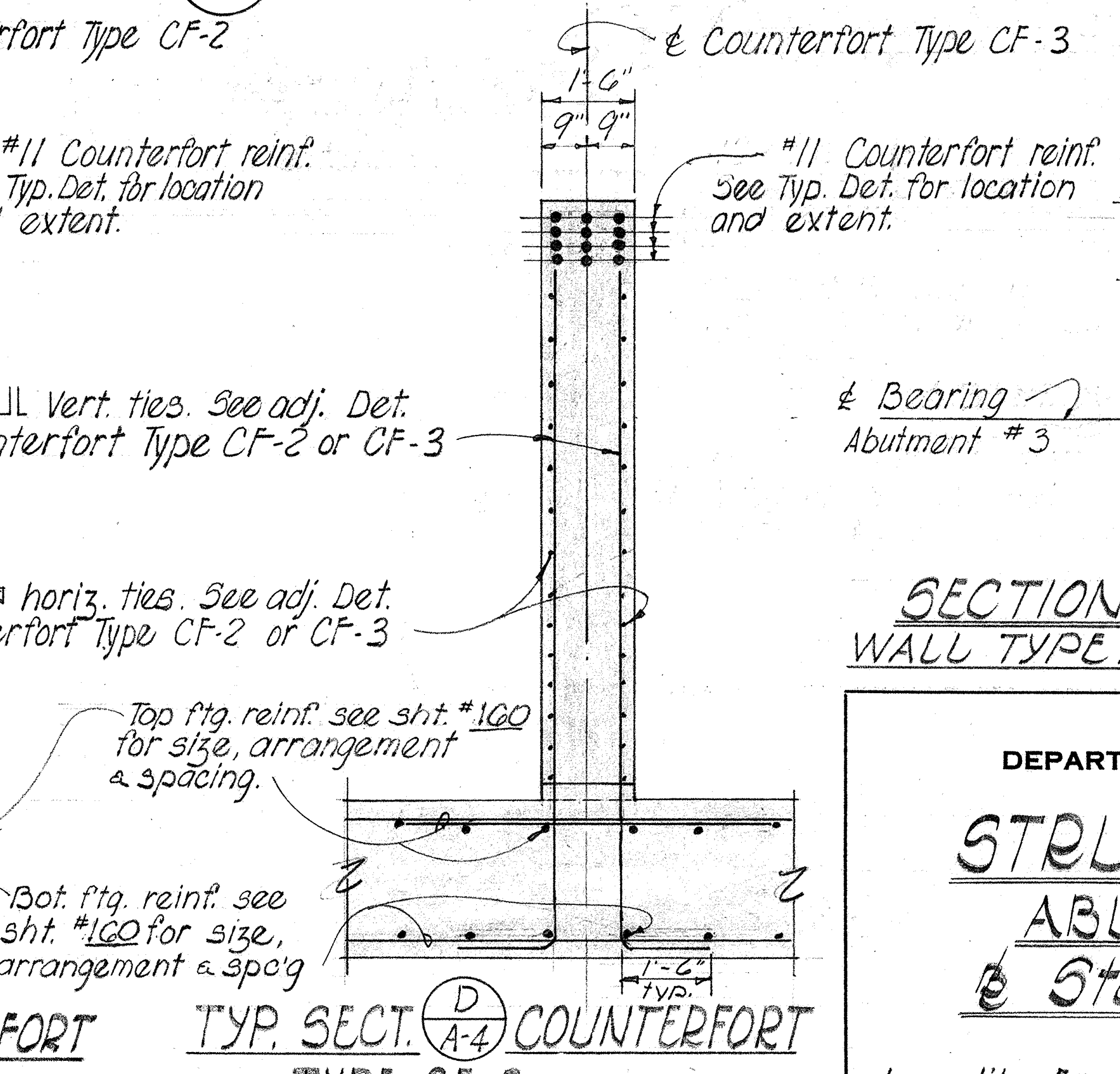
SECTION (C/A-4) WALL TYPE AW-2

Reference: Front face of wall

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



℄ Counterfort Type CF-2
1'-6"
9" 9"
1'-6" TYP.



#11 Counterfort reinf. See Typ. Det. for location and extent.
#6 vert. ties. See adj. Det. Counterfort Type CF-2 or CF-3
#4 horiz. ties. See adj. Det. Counterfort Type CF-2 or CF-3
Top ftg. reinf. see sht. #160 for size, arrangement & spacing.
Bot. ftg. reinf. see sht. #160 for size, arrangement & spc'g
℄ Counterfort Type CF-3
1'-6"
9" 9"
#11 Counterfort reinf. See Typ. Det. for location and extent.
1'-6" TYP.
℄ Bearing Abutment #3

TYP. SECT. (E/A-4) COUNTERFORT TYPE CF-2

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

TYP. SECT. (D/A-4) COUNTERFORT TYPE CF-3

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE Nº 3
ABUTMENT Nº 3
℄ Sta. 54 + 50.61

Lunalilo Freeway
Project Nº I-H1-1(4):24

SHEET No. A-4 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY		DATE
	DRAWN BY	H. Mizomi	"
	TRACED BY		"
NOTE BOOK	DESIGNED BY	V. Ching	" 2-63
	QUANTITIES BY	H. M. N.Y.	"
No.	CHECKED BY	P. Yamashita I.T.O.	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	160	217

Revision #1 - 7/63 - Revised Wall Elevations

Normal footing reinforcing
Limits of flare bars 10" maximum at outer edge.
Limits of flare bars 5" min. measured along back face of wall
REVISION NO. 1
Wingwall #1 reinforcing see corresponding detail
Reference front face of wall
Standard Retaining Wall Reinf. h=20R
4'-0"
11'-0"
#10 @ 5" stop alternate bars as shown
Limits #10 @ 5" stop alt. bars as shown
Reference ℄ Pier Col. Ⓘ
Limits #10 @ 5" stop alt. bars as shown
#4 @ 12 cont. place under #10 bars
1-#4 added
3-#10 top added extend 3'-0" under intersecting reinf.
Limits #10 @ 8" top hicky under intersecting footing reinf. as shown - stop alt. bars as shown
#4 @ 12 cont. place under #10 bar - extend bars as shown
#4 @ 18 cont. top extend to limits as shown
Abutment Wall Type AW-4 footing reinf. see Typical Section
6'-6"
7'-0"
12'-9" o.c.
12'-9" (Typical)
℄ Counterfort CF-1
3'-0"
℄ Counterfort Type CF-1
Stop alternate bars as shown
#6 cont. thruout
#6 top longitudinal reinforcing
Balance @ 18"
4 spa. @ 12" 3 spa @ 8" 2 spa @ 6"
18'-0"
25'-3"
7'-3"
14'-0"
8'-9"
5'-3"
#5 @ 18" between counterforts thruout (Typ.)
℄ Counterfort Type CF-2
5-#5 x 6'-0" long added bottom cont. as shown
℄ Counterfort Type CF-3
#5 @ 18" cont. thruout
Abutment See Det. Sht. #159
Abutment Wall Type AW-2 and as detailed
Wingwall #1
Balance Type X - See Standard Ret Wall Sht. #180
Top Wall El. 62.12
Top Wall El. 62.09
Outline future concrete railing & end post - see Standard Aluminum Railing Details.
Extent of reinf. for concrete & aluminum railing - see Standard Aluminum Railing Drawing for size and spacing
15'-0" Type T
17'-0" Type M
Expansion joint in wall similar as shown on Standard Retaining Wall Detail
Present 4" dia. tile drain in wall @ 10'-0" exact location to be determined in field by the Engineer to suit finish grade line
Approx. future finish grade line
Approx. exist. ground line
Top Wall El. 40.00
12" footing step see Standard Retaining Wall
Bot. footing El. 28.00
Bot. ftg. El. 22.50
4'-3"
2'-0"
½" Joint
Reference ℄ Pier Column Ⓘ
1'-3" Abutment stem
℄ Bearing Abutment #3
42'-0¼" to ℄
44'-0¾" to ℄
Reference front face of wall AW-5
Top of wall elevation see Elev.
Limits ½" recess for future premolded joint filler
#4 @ 18"
#4 @ 18" extend into shelf.
#4 @ 18" thruout
#4 @ 12"
Abutment wall Type AW-5 for face reinf. & type - see Sht. #156
Waterproofing - see Standard Specifications
Top footing reinf. - see Plan for size, arrangement and spacing.
Bot. Ftg. El. 32.00
Bot. Ftg. reinf. see Plan for size & spacing
Abutment wall Type AW-5 see Elev. for type & reinf.
Triple #5 cl. ties see column detail for spcg.
37-#14 vertical column bars spa. equally as shown
Reference ℄ Pier Column Ⓘ
6" Typ.
#4 @ 18"
1-#4 extend into footing
℄ Bearing Abutment #3
#4 @ 12 extend into footing
2'-10"
4'-0"
3'-6"
Reference front face of wall
Stem reinf. - bend into footing. See Retaining Wall h=26'R
Vert. stem reinf. - bend into bottom of footing. Stop alternate bars as shown.
#11 @ 12
Reference ℄ Pier Col. Ⓘ
#4 @ 18 cont. - stop as shown. See Typical Section
Bottom layer #11 flare bars 10" max. spacing
Limits of flare bars 7" max. measured along front face of wall
1-#4 added
5-#11 x 7'-0" added straight
Abutment AW-4 wall reinf. bend into footing - see Typical Section
#5 @ 14" bottom layer - lap with alternate #11 bars See Typical Abut. Section
Stop alt. bars as shown
Stop alternate bars as shown
#6 cont. thruout
#6 bottom longitudinal reinforcing
#5 @ 14 bottom layer - lap with alt. #11 bars
2'-0" lap
#5 @ 14" hicky over flare bars as required
Limits of flare bars 3" min. spacing
#11 @ 7" x 10'-0" long bottom layer
℄ Counterfort Type CF-2
#5 @ 16" cont.
℄ Counterfort Type CF-3
#11 bot. layer - limits of flare bars 5" min., 7" max. measured along front face of wall. Extend beyond wall as shown
Limits of flare bars 10" maximum spacing at outer end
#11 @ 7" bottom layer - see Typical Section
#11 @ 7" bottom layer See Typical Section

END - AT COLUMN Ⓘ

TYPICAL BETWEEN INTERMEDIATE COUNTERFORT CF-1

END - AT WINGWALL #1

TYPICAL ARRANGEMENT OF TOP FOOTING REINFORCEMENT - ABUTMENT No 3

DEVELOPED ELEVATION (E/A-5)

Scale: 3/16" = 1'-0"

SECTION (B/A-5) Scale: 3/8" = 1'-0"

SECTION (F/A-5)

Scale: 1/4" = 1'-0"

END - AT COLUMN Ⓘ

TYPICAL BETWEEN INTERMEDIATE COUNTERFORT CF-1

END - AT WINGWALL #1

TYPICAL ARRANGEMENT OF BOTTOM FOOTING REINFORCEMENT - ABUTMENT No 3

Scale: 3/16" = 1'-0"

SECTION (C/A-5) Scale: 3/8" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE No 3

ABUTMENT No 3

℄ Sta. 54 + 50.61

Lunalilo Freeway Project No I-H1-1(4):24

SHEET No. A-5 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	
	DRAWN BY	Young
	TRACED BY	
	DESIGNED BY	Y.G. H.N.
NOTE BOOK	QUANTITIES BY	N.Y. H.N.
No.	CHECKED BY	P. Yamashita J.T.O.

DATE

160

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	161	217

Reference-Front face of Wall
Cantilever
Wing Wall #2
#5 @ 12
2'-0"
#4 @ 12 vert.
Normal Ret. Wall Reinf.
SECTION O A-6
SCALE: 1/2" = 1'-0"
Approximate location - 4' x 4' Box Culvert
54'-3"
See Elevation
Wingwall #2
7'-0" Cantilever
Wingwall #2 - See Standard Retaining Wall Sht. # S-2
17'-0" Type K
15'-0" Type O
15'-3" Type W
See Plan
6'-3"
Top Wall El. 62.00
REVISION NO. 1
Construction Jt. see plan
Reference-top concrete shelf
Drip Line
El. 48.33
Approximate existing ground
#4 @ 12 vert. both faces
El. 44.0
#5 @ 12 both faces
Present 4" dia. tile drain in wall @ 10'-0" exact location to be determined in field by the Engineer to suit finish grade line
El. 38.00
Ftg. step - see Typ. Retaining Wall Std.
El. 30.50
El. 60.84
El. 60.71
Outline future abutment stem extension
Top concrete seat @ ℄ bearing El. 56.82
Top concrete seat @ ℄ bearing El. 56.67
Outline #11 dowels thruout - see Plan for location & spacing
Approx. future finish grade line at face of wall.
Balance Abutment Type AW-7
17'-3" Abutment Type AW-6
Ftg. step reinf. similar as shown for Standard Retaining Wall footing.
DEVELOPED ELEVATION H A-6 ABUTMENT #4
SCALE: 3/16" = 1'-0"
Revision #1 - 7/63 - Revised Wall Elevation.
73'-6" to Base Line
Return drip around top of abutment as shown
2-#4 vertical cont. to top
67°45'30"
SECTION A A-6 Scale: 3/8" = 1'-0"
Retaining wall key reinf. & detail similar as shown for Wingwall Connection Det. Sht. #173
75'-9 7/8" to Base Line
2-#10 vert. bend into ftg.
2-#4 vert. added extend 2'-6" into shelf
Normal Abut. stem reinf.
2-#7 bent into shelf
#4 @ 12 cl. stirrups
SECTION B A-6 Scale: 3/8" = 1'-0"
Retaining wall key reinf. & detail similar as shown for Wingwall Connection Detail Sht. #173
#4 @ 18 cl. stirrups
2-#10 vertical bend into ftg.
6-#4 as shown - stop at shelf
W.P. "B"
Bearing Abutment
2-#4 bent
Normal Abut. stem reinf.
SECTION C A-6 Scale: 3/8" = 1'-0"
℄ Bearing Abutment
4" x 3/4" cont. rolled lead ℞. See Std. Specs. Space between lead ℞ and dowels to be filled with molten lead.
3/4" chamfer
Top conc. seat
2-#4 cont.
2-#11 cont.
#4 @ 12
#11 @ 12 dowels 8'-0" long
Reference - front face of Abutment
TYP. ABUT. SEAT DETAIL
SCALE: 3/4" = 1'-0"
3" Drip
#5 @ 12 both faces
#4 @ 12 vert. both faces
67°45'30"
P.I.W.P. "B"
Top conc. shelf @ ℄ Bearing El. 56.50
SECTION N A-6
SCALE: 1/2" = 1'-0"
42'-0 1/4"
Reference front face of abut. cutoff wall
73'-6"
17'-3" Wall Type AW-6
Edge abutment footing
Top concrete shelf @ ℄ bearing & face of wall El. 56.33
4" dia. tile drain
℗ Sta. 55 + 33.61
℄ Brg. Abut. #4
Az. 230°-46'-00"
Base Line Freeway
7 eq. spc. = 8'-6"
#11 Dowel Spacing
Bal. @ 12
Balance 17'-9 5/8" Type AW-7
Face of abutment & Retaining Wall #2
Reference front face abutment wall AW-5
16'-0"
30'-10 1/4"
75'-9 7/8"
PLAN ~ ABUT. #4
SCALE 3/16" = 1'-0"
El. 28.50
5'-3 1/2"
2-#7 bent into shelf
Reference - ℄ Brg. Abut. #4
6:12 slope
#4 @ 12 cl. tie
2-#4
4 str. add bars
#4 @ 12 cl. stirrups
#4 @ 18 - extend into ftg. see sect. E A-6
2-#10 vert. added bend into ftg.
#4 @ 18 cl. stirrups
2-#4 bent
SECTION L A-6
SCALE: 3/8" = 1'-0"
Outline - Approach slab where occurs
2" x 4" cont. Key
2-#5 cont. top
Continuous 1/2" slot for future premolded joint filler
#4 @ 12" thruout
1-#4 cont.
℄ Bearing Abutment #4
#4 @ 12" thruout - extend bars above stem as shown
1 3/8" x 4" cont. shelf drain
#4 @ 18 cont.
Abutment seat - see Typical Detail
Reference top concrete shelf
Slope 1/2" / ft.
3/4" chamfer
1:1 slope
4" dia. tile drain - see Abut. Plan for location
1:12 Batter
#4 @ 12 extend into footing as shown
#4 @ 18 cont.
#10 @ 6 - bend into ftg. as shown
Waterproofing - see Std. Specs.
#10 @ 7 1/2 Type AW-7
#10 @ 6 Type AW-6
6'-6" Type AW-7
7'-0" Type AW-6
#4 @ 18 cont.
bars in same plane
18'-0" Type AW-7
20'-0" Type AW-6
Type AW-6 3'-6"
Type AW-7 3'-3"
TYPICAL SECTION ~ ABUT. #4
SCALE: 3/8" = 1'-0"
Bottom footing elevation - see Abutment Elevation
Reference-face of abut. cut-off wall & front face of AW-5
Normal abut. stem reinf. see Typical Abut. Section
Reference - ℄ Bearing Abut. #4
1 3/8" x 4" cont.
1/2" setback for future premolded filler
2-#10 vert. added extend 1'-6" into Abut. shelf.
#4 @ 18 added as shown
Wall Type AW-5
SECTION D A-6
Scale: 3/8" = 1'-0"
Normal Abut. stem reinf. See typical Abut. section
Abut. Wall AW-5 key Reinf. & Detail similar as shown for Wingwall Connection Detail Sht. #173
SECTION E A-6
Scale: 3/8" = 1'-0"
#4 @ 12 cl. ties
2-#7 bent into shelf
2-#4
SECTION K A-6
SCALE: 3/8" = 1'-0"
Standard Ret. Wall Reinf. Type N
#4 @ 18 cont. thruout
2-#10 vert. from stem above
8" max. spac.
℄ Bearing Abutment #4
Normal Abut. Stem Reinf. bent into footing
#10 bottom added flare as required
BOTTOM FOOTING REINFORCING SECTION F A-6
Standard Ret. Wall Reinf. Type W
#10 added - 12" max. flare as required
3" minimum bar spacing
#4 @ 18 cont. thruout
18" max. bar spacing
Flare top bars as required - 18" max. spacing @ edge of footing
#4 @ 18 cont. abutment bars stop as shown
TOP FOOTING REINFORCING
Scale: 3/16" = 1'-0"
#4 @ 18 cont. abutment thruout
Cut bars as shown
#10 @ 6 - Normal Abutment reinf.
Reference ℄ bearing @ abutment #4
Typical Abutment Wall AW-5 Reinf.
TOP FOOTING REINFORCING SECTION G A-6
Scale: 3/16" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE No 3

ABUTMENT No 4

℗ Sta. 55 + 33.61

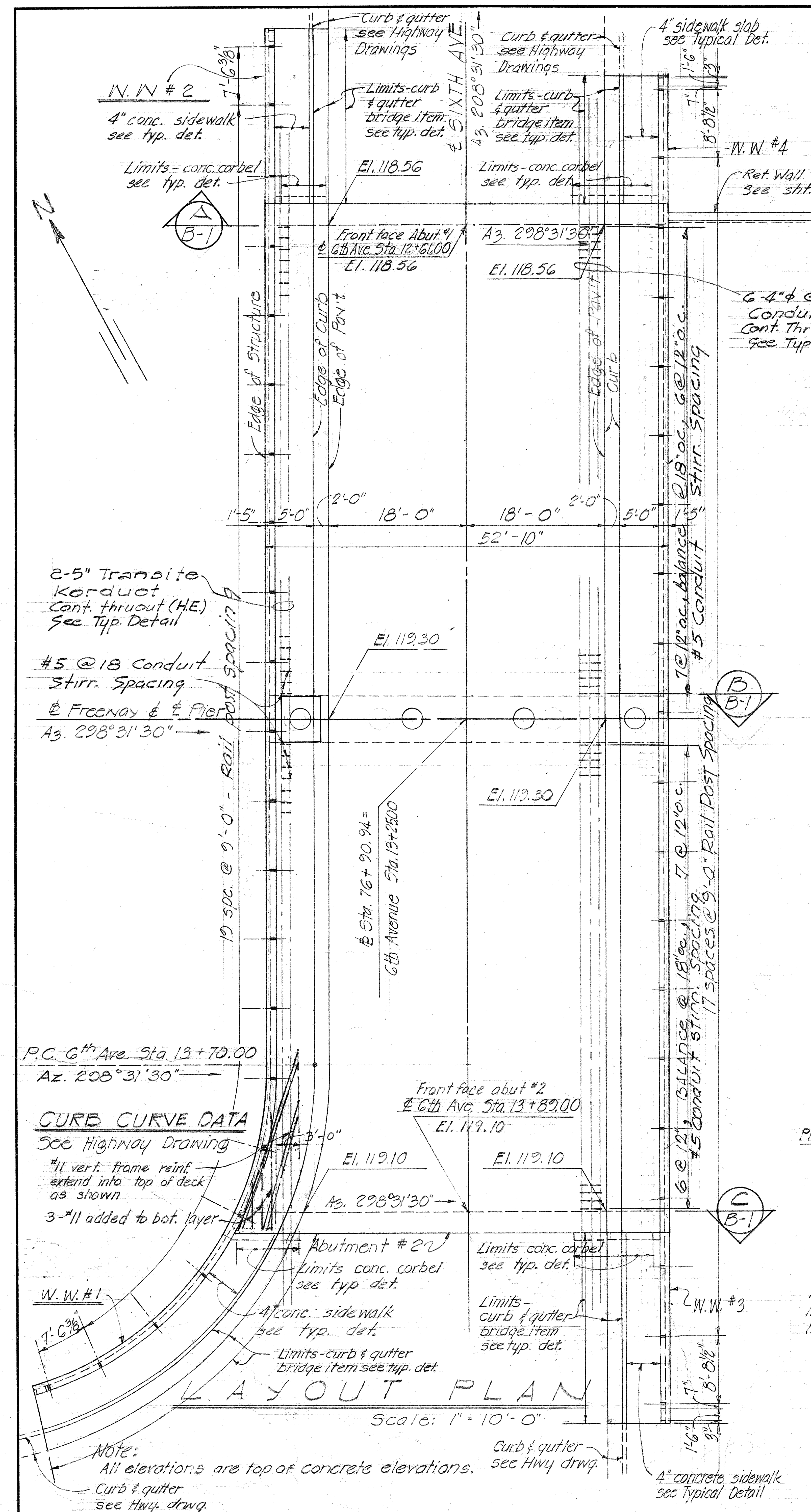
Lunalilo Freeway Project No I-H1-1(4):24

SHEET No. A-6 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY J. Fukui	DATE
	DRAWN BY H.N.	"
NOTE BOOK	TRACED BY	"
	DESIGNED BY J.F. T.M.	"
No.	QUANTITIES BY P. Yamashita	"
	CHECKED BY J.T.O.	"

161

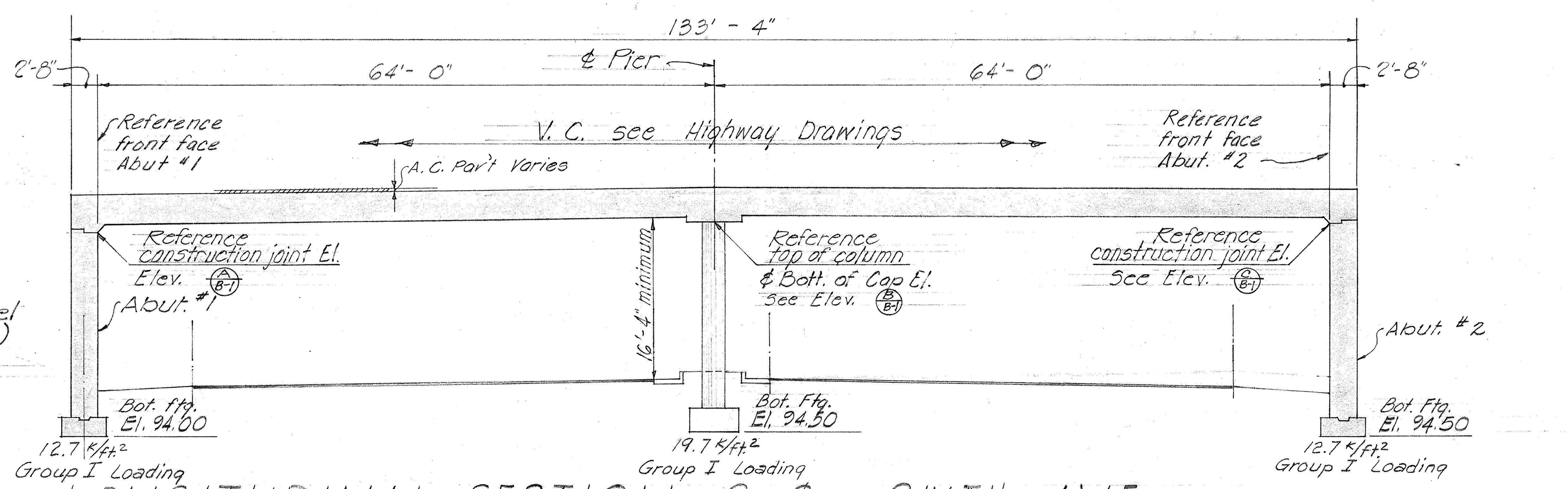
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	162	217


W.W. #2
4" conc. sidewalk see typ. det.
Curb & gutter see Highway Drawings
Limits-curb & gutter bridge item see typ. det.
℄ SIXTH AVE
Az. 298°31'30"
Curb & gutter see Highway Drawings
Limits-curb & gutter bridge item see typ. det.
4" sidewalk slab see typical Det.
W.W. #4
Limits-conc. corbel see typ. det.
El. 118.56
Ret. Wall #6-IB See sht. #163
Front face Abut.#1 & 6th Ave. Sta. 12+61.00 El. 118.56
Az. 298°31'30"
El. 118.56
6-4"⌀ Galv. Steel Conduits (H.T.) Cont. Thruout See Typ. Detail
Edge of Structure
Edge of Curb
Edge of Pav't
Edge of Pav't
Curb
6 @ 12" o.c. 6 @ 18" o.c. Balance @ 12" o.c. #5 Conduit Stirr. Spacing
1'-5" 5'-0" 2'-0" 18'-0" 18'-0" 2'-0" 5'-0" 1'-5"
52'-10"
2-5" Transite Korduct Cont. thruout (H.E.) See Typ. Detail
#5 @ 18 Conduit Stirr. Spacing
℄ Freeway & ℄ Pier
Az. 298°31'30"
El. 119.30
El. 119.30
19 spc. @ 9'-0" - Rail post spacing
℄ Sta. 76+90.94 = 6th Avenue Sta. 13+25.00
7 @ 12" o.c. 7 spaces @ 9'-0" Rail Post Spacing
6 @ 12" o.c. Balance @ 18" o.c. #5 Conduit Stirr. Spacing
P.C. 6th Ave. Sta. 13+70.00
Az. 298°31'30"
CURB CURVE DATA
See Highway Drawing
#11 vert. frame reinf. extend into top of deck as shown
3-#11 added to bot. layer
Front face abut #2 & 6th Ave. Sta. 13+89.00 El. 119.10
El. 119.10
El. 119.10
Az. 298°31'30"
Abutment #2
Limits conc. corbel see typ det.
Limits conc. corbel see typ. det.
W.W. #1
W.W. #3
4" conc. sidewalk see typ. det.
Limits-curb & gutter bridge item see typ. det.
Limits-curb & gutter bridge item see typ. det.
7'-6⅜"
8'-8⅜"
Curb & gutter see Hwy drwg.
4" concrete sidewalk see Typical Detail
Curb & gutter see Hwy. drwg.
A B-1
B B-1
C B-1
N

LAYOUT PLAN

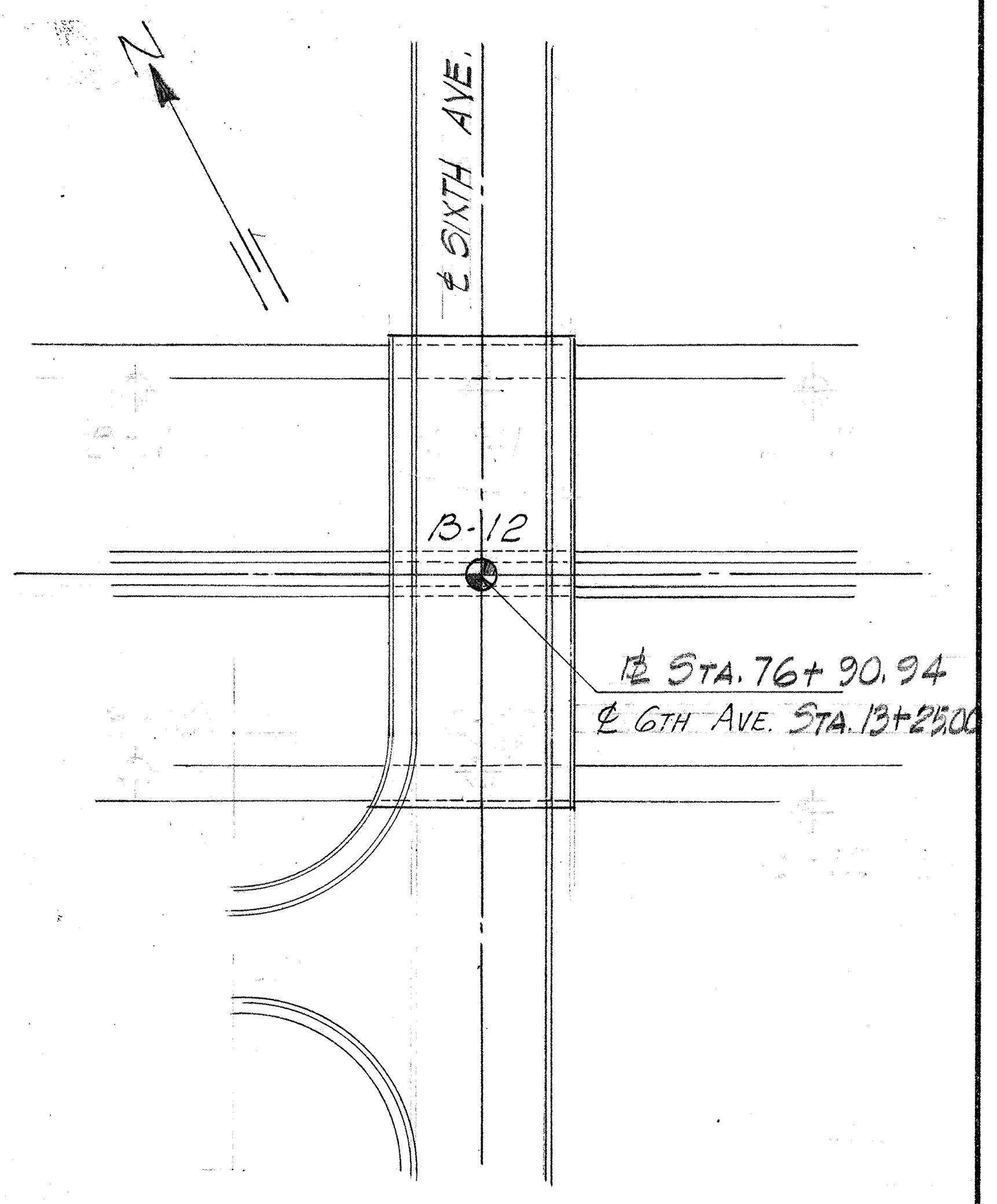
Scale: 1" = 10'-0"

Note:
All elevations are top of concrete elevations.


133'-4"
2'-8"
64'-0"
℄ Pier
64'-0"
2'-8"
Reference front face Abut #1
V.C. see Highway Drawings
A.C. Pav't Varies
Reference front face Abut. #2
Reference construction joint El.
Elev. A B-1
Abut. #1
16'-4" minimum
Reference top of column & Bott. of Cap El. See Elev. B B-1
Reference construction joint El. See Elev. C B-1
Abut. #2
Bot. Ftg. El. 94.00
Bot. Ftg. El. 94.50
Bot. Ftg. El. 94.50
12.7 k/ft² Group I Loading
19.7 k/ft² Group I Loading
12.7 k/ft² Group I Loading

LONGITUDINAL SECTION @ ℄ SIXTH AVE.

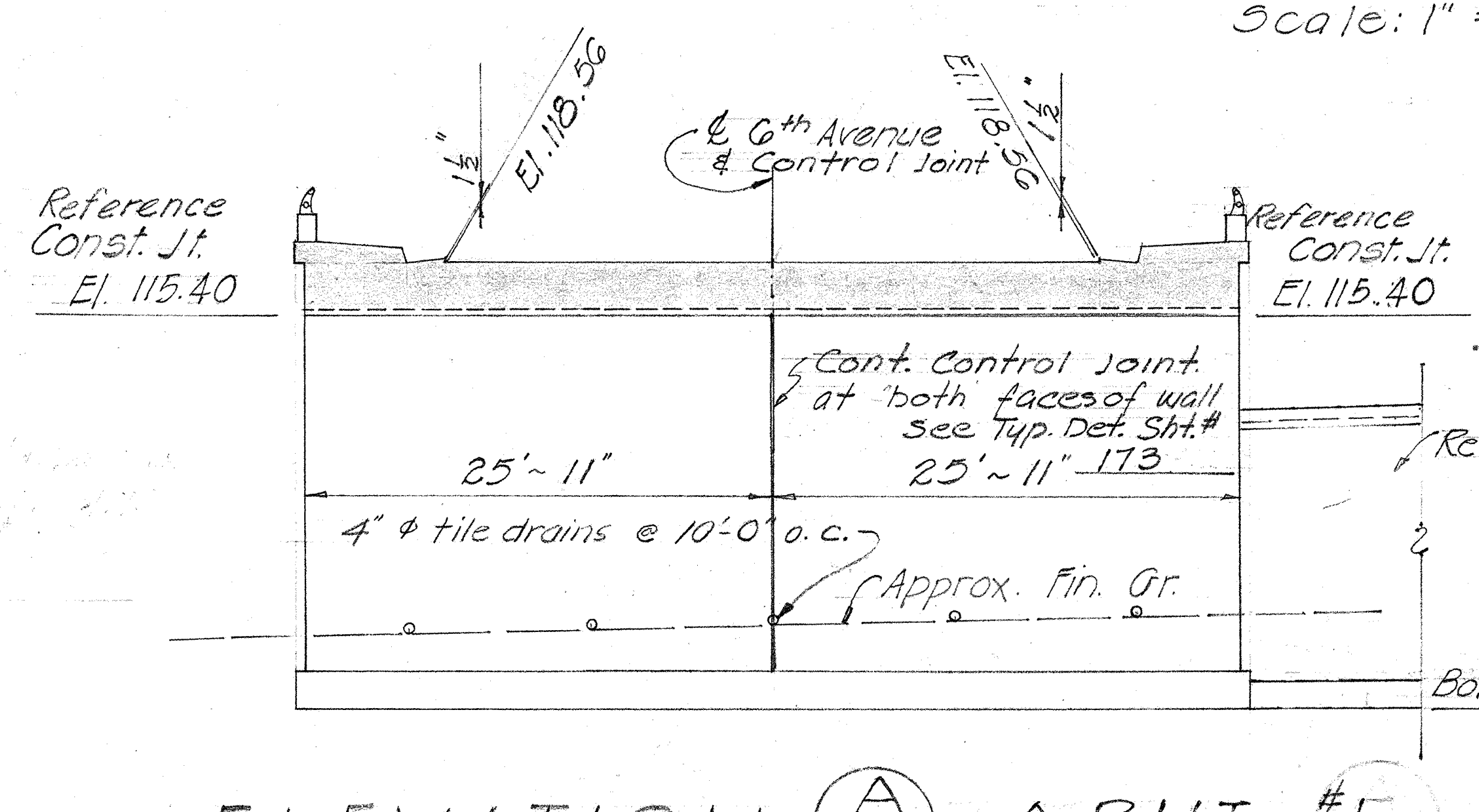
Scale: 1" = 10'-0"


N
℄ SIXTH AVE.
B-12
℄ Sta. 76+90.94
℄ 6th Ave. Sta. 13+25.00

LOCATION PLAN

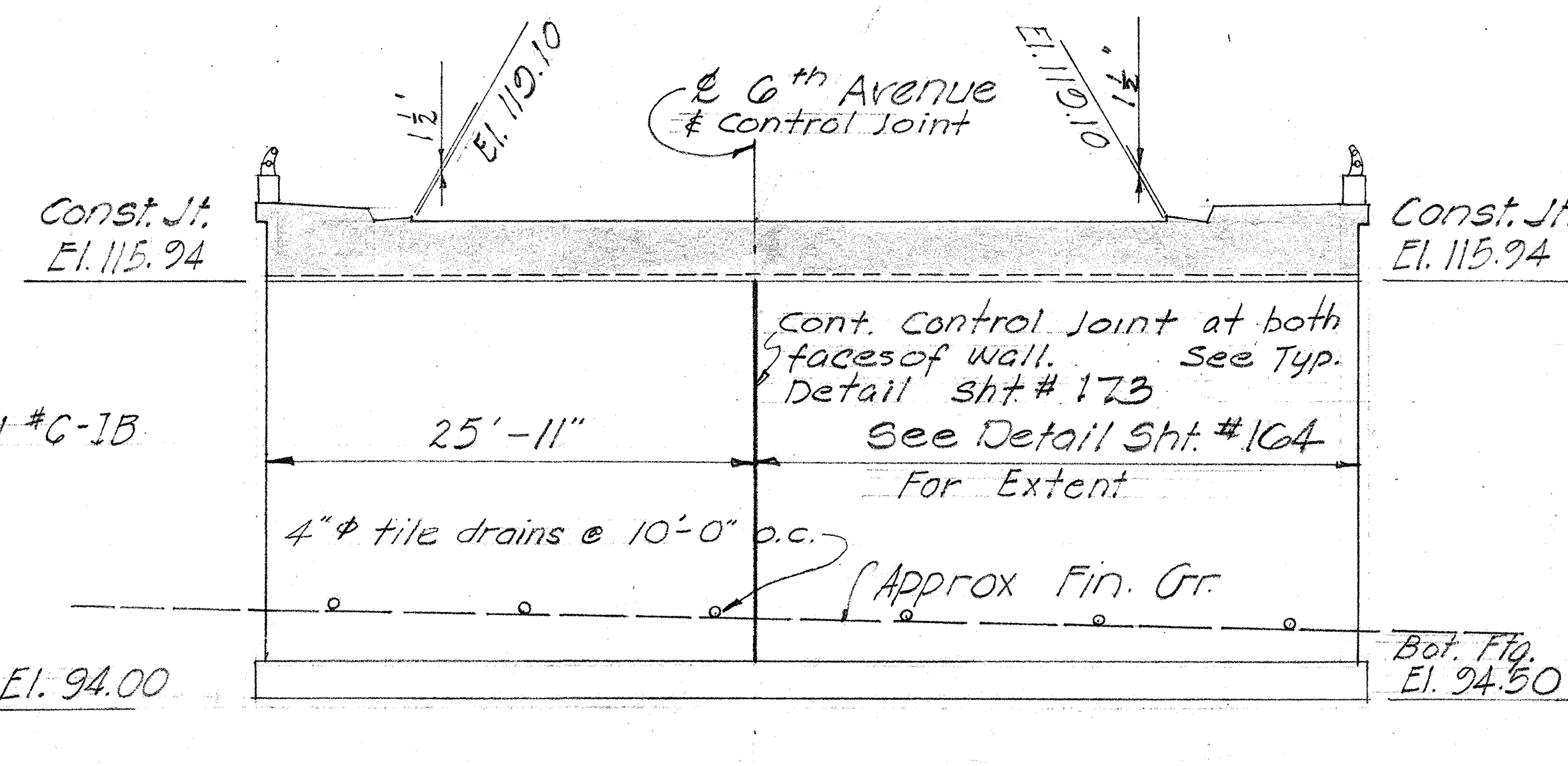
Scale: 1" = 50'-0"

ESTIMATED QUANTITIES		
Class A-1 Concrete Lump Sum	(1,156	c.y.)
Reinforcing Steel Lump Sum	(197,810	lbs.)
Structural Excavation	482	c.y.
Asphaltic Paving Mix No. V	47	tons
Asphaltic Paving Mix No. III	35	tons
Bituminous Tack Coat	134	gals.
Filter Material	112	c.y.
Concrete Railing	367	lin. ft.
Metal Bridge Railing	361	lin. ft.


El. 118.56
℄ 6th Avenue & Control Joint
El. 118.56
Reference Const. Jt. El. 115.40
Reference Const. Jt. El. 115.40
Cont. Control Joint at both faces of wall See Typ. Det. Sht.# 173
25'-11"
25'-11"
Ret. Wall #C-IB
4"⌀ tile drains @ 10'-0" o.c.
Approx. Fin. Gr.
Bot. Ftg. El. 94.00

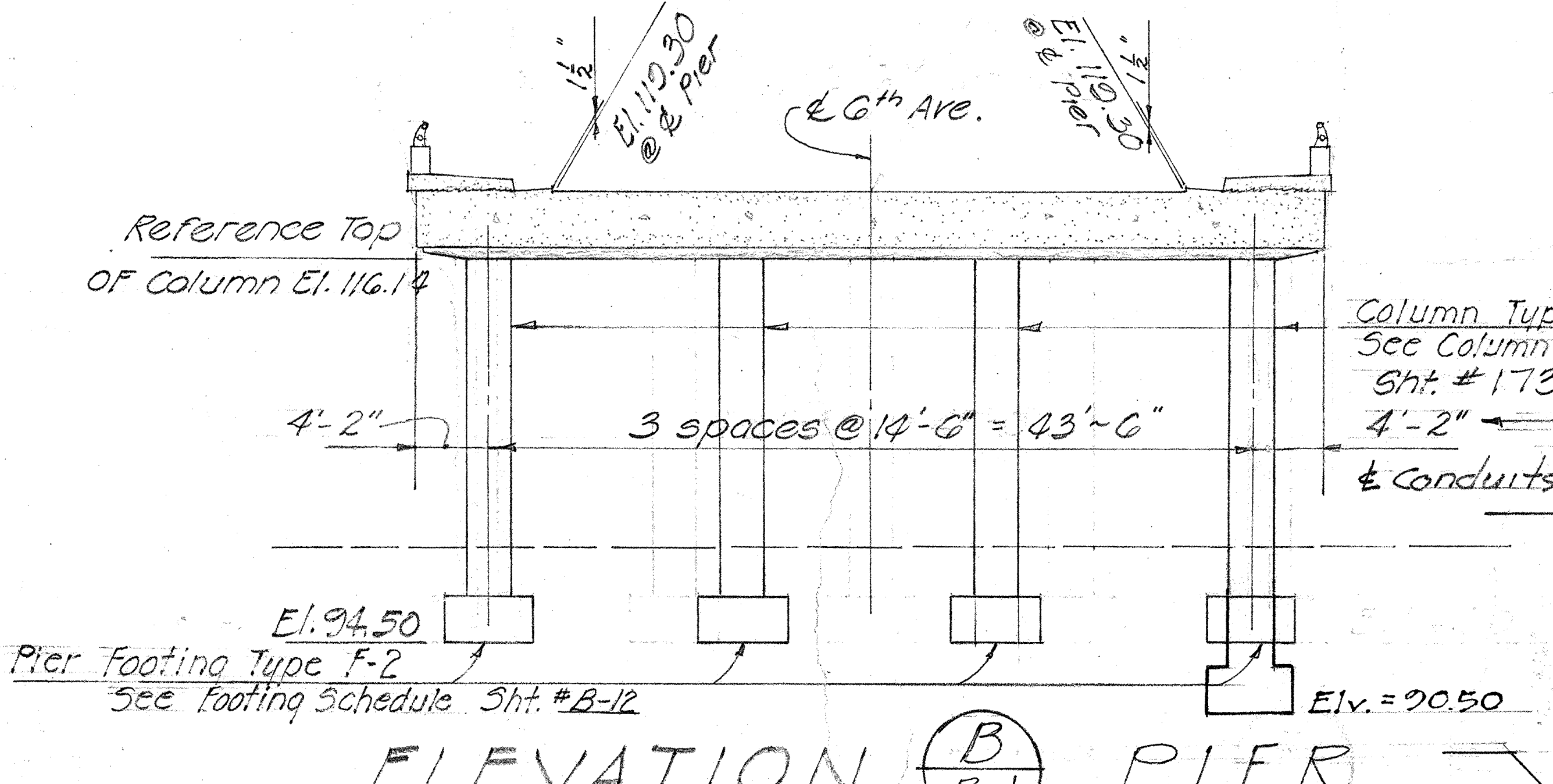
ELEVATION (A/B-1) ABUT. #1

Scale: 1" = 10'-0"


El. 119.10
℄ 6th Avenue & Control Joint
El. 119.10
Const. Jt. El. 115.94
Const. Jt. El. 115.94
Cont. control joint at both faces of wall. See Typ. Detail sht # 173
25'-11"
See Detail Sht. #164 For Extent
4"⌀ tile drains @ 10'-0" o.c.
Approx. Fin. Gr.
Bot. Ftg. El. 94.50

ELEVATION (C/B-1) ABUT. #2

Scale: 1" = 10'-0"


El. 119.30 @ ℄ Pier
℄ 6th Ave.
El. 119.30 @ ℄ Pier
Reference Top of Column El. 116.14
Column Type II See Column Schedule Sht. # 173
4'-2"
3 spaces @ 14'-6" = 43'-6"
4'-2"
El. 94.50
Pier Footing Type F-2 See Footing Schedule Sht. # B-12
Elv. = 90.50

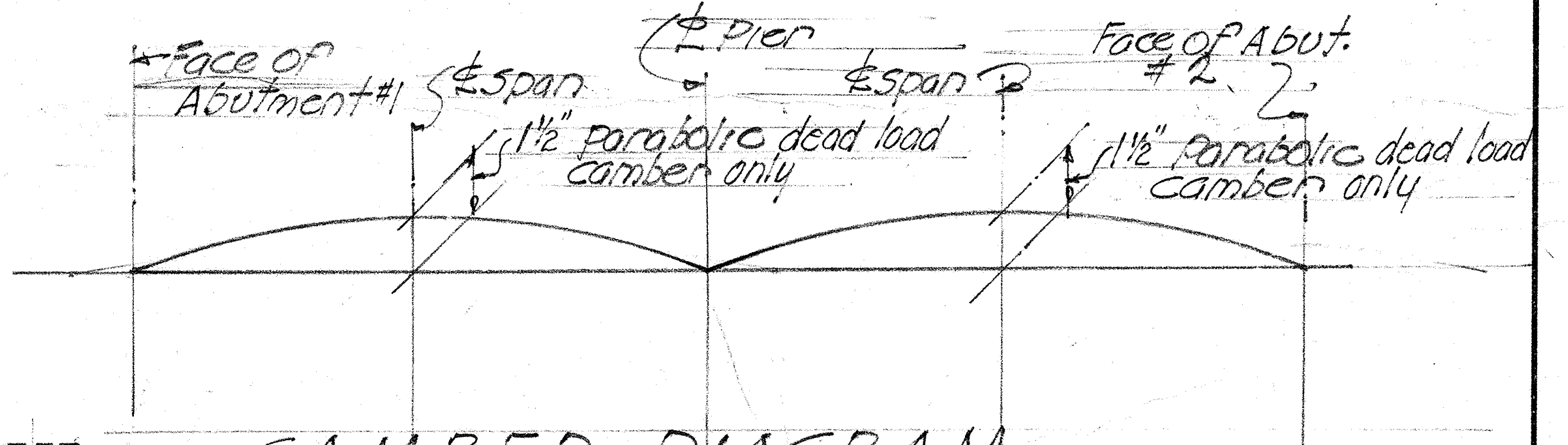
ELEVATION (B/B-1) PIER

Scale: 1" = 10'-0"

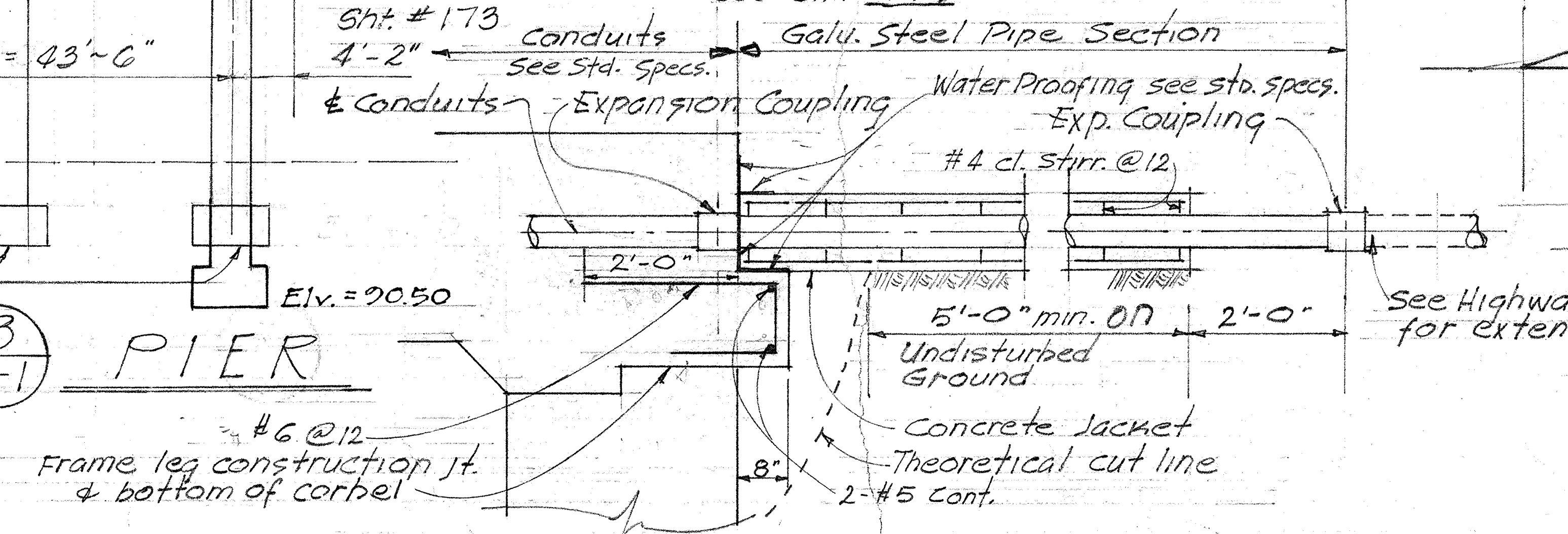
Reference Notes:

Top of conc. deck to follow roadway & profile grade.

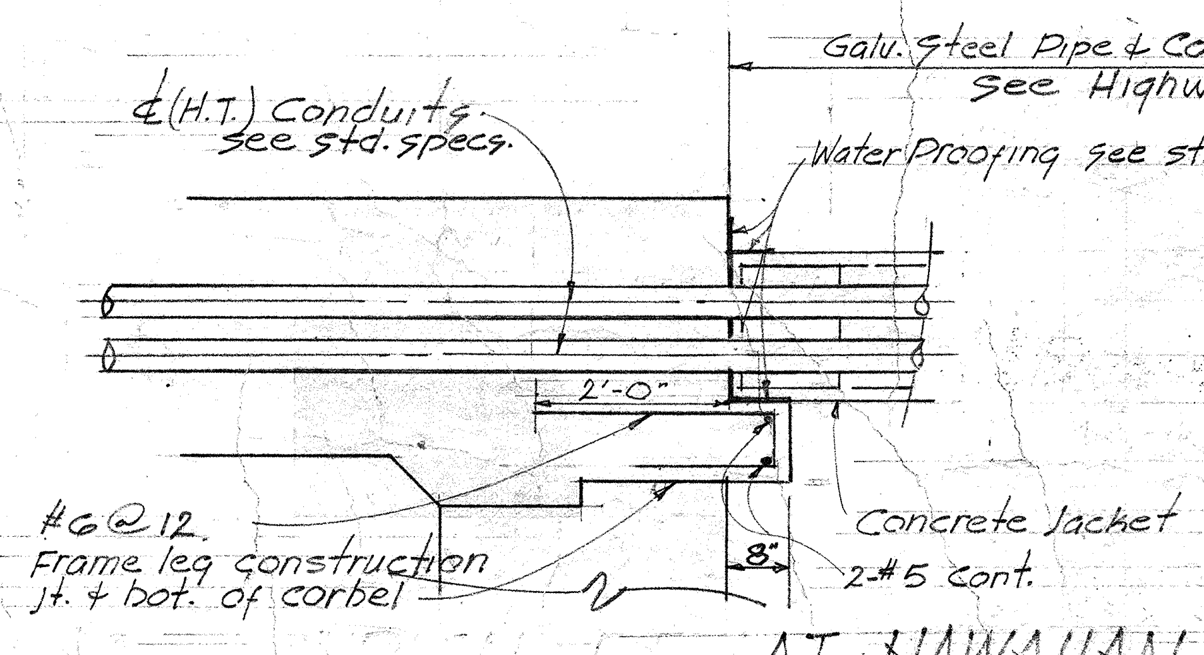
For Typical Details, see sht # 173
For General Notes, see sht # 173
For frame superstructure reinf. details see Sht. #167


Face of Abutment #1
℄ Span
1½" Parabolic dead load camber only
℄ Pier
℄ Span
Face of Abut. #2
1½" Parabolic dead load camber only

CAMBER DIAGRAM. NO SCALE

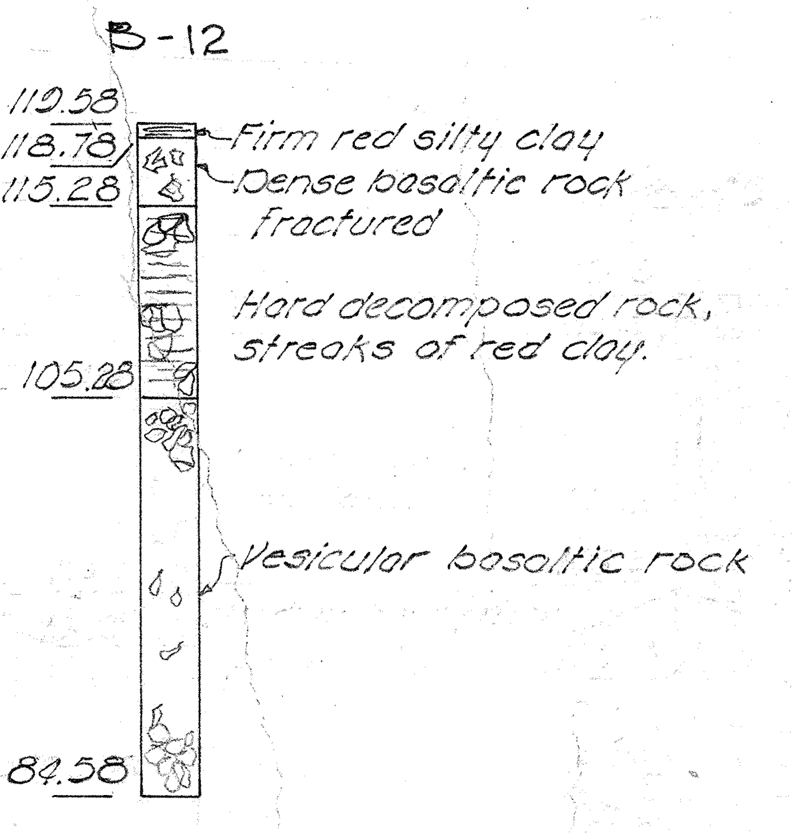

Conduits See Std. Specs.
Galv. Steel Pipe Section
℄ Conduits
Expansion Coupling
Water Proofing see std. specs.
Exp. Coupling
#4 cl. Stirr. @ 12
2'-0"
5'-0" min. on
2'-0"
See Highway drawing for extension or plug
Undisturbed Ground
#6 @ 12
Frame leg construction jt. & bottom of corbel
Concrete Jacket
Theoretical cut line
8"
2-#5 Cont.

AT HAWAIIAN ELECTRIC CONDUITS


Galv. Steel Pipe & Concrete Jacket Extension See Highway Drawing
℄ (H.T.) Conduits See std. specs.
Water Proofing see std. specs.
2'-0"
#6 @ 12
Frame leg construction jt. & bot. of corbel
8"
Concrete Jacket
2-#5 Cont.

AT HAWAIIAN TELEPHONE CONDUITS

TYPICAL CONDUIT APPROACH AT ABUTMENTS


B-12
112.58
118.78
115.28
105.28
84.58
Firm red silty clay
Dense basaltic rock fractured
Hard decomposed rock, streaks of red clay.
Vesicular basaltic rock

APPROVED:

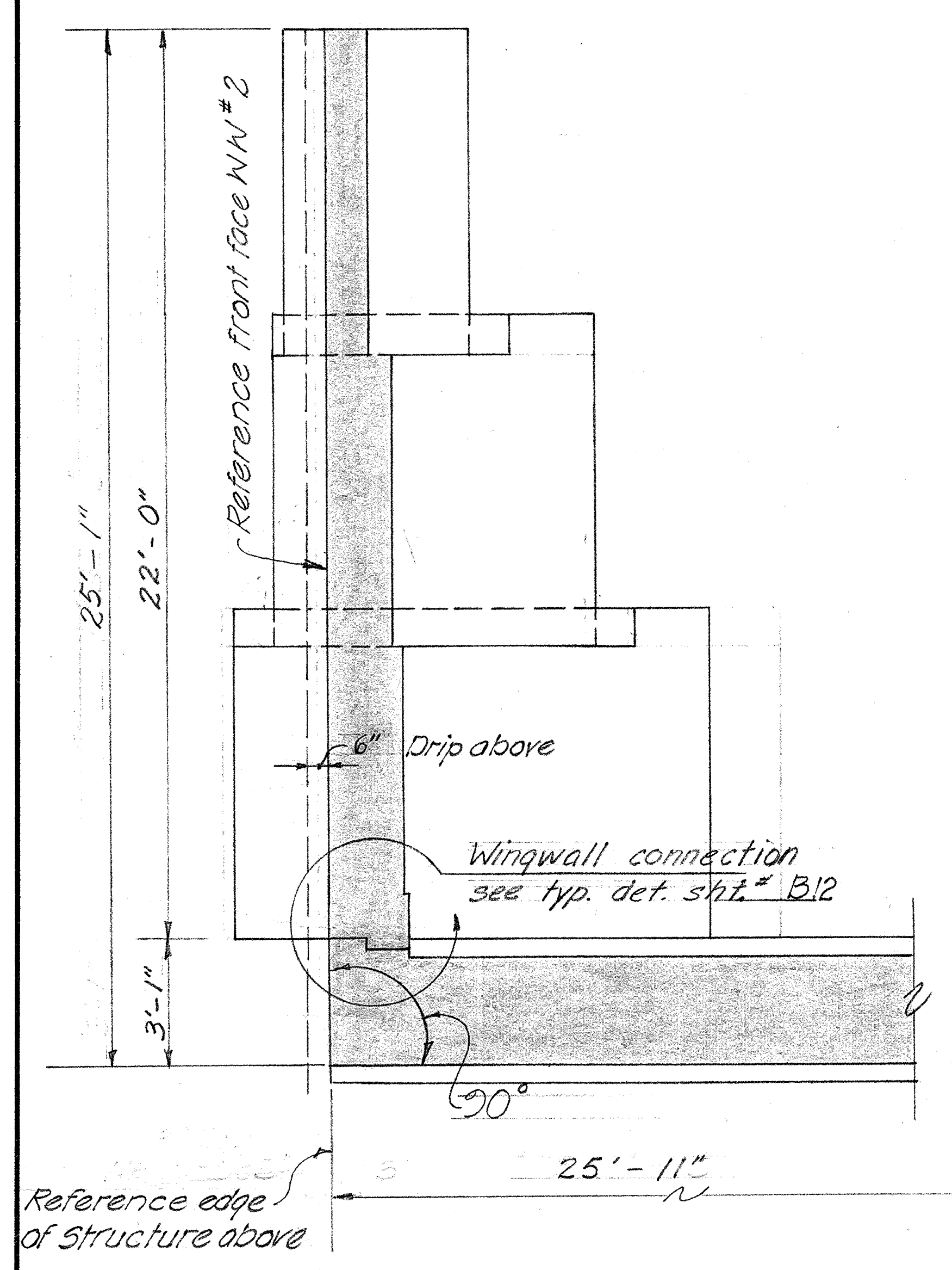
	DATE
Norman Ah Kan PRINCPL. DISTR. ENG'R., H.E.CO.Ltd.	5/1/63 DATE
F. H. Judd PLANT. ENG'G. SUPV., H.T.CO.Ltd.	4-30-63 DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURE No 6
SIXTH AVE. SEPARATION
℄ Sta. 76 + 90.94
LUNALILO FREEWAY PROJ. No I-HI-1(4):24
SEPT. 1962

SHEET No. B-1 OF SHEETS

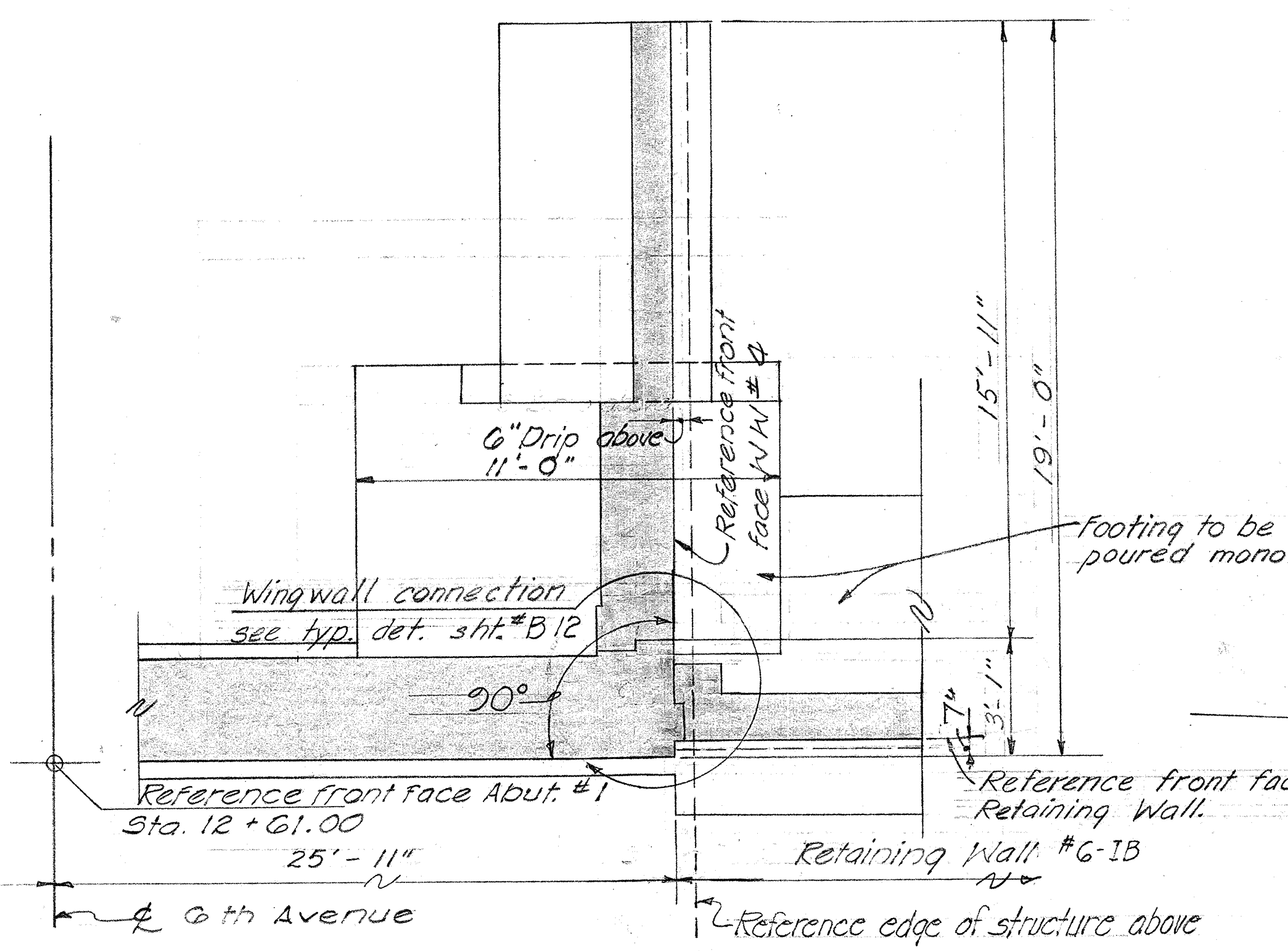
ORIGINAL PLAN		DATE
	SURVEY PLOTTED BY	
	DRAWN BY S. Yong	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY V. Ching T.S.	" 2-63
	QUANTITIES BY S.Y. T.S.	"
No.	CHECKED BY P. Yamashita J.T.O.	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	163	217


25'-1"
22'-0"
3'-1"
Reference front face WW #2
6" Drip above
Wingwall connection see typ. det. sht.# B12
90°
25'-11"
Reference edge of Structure above

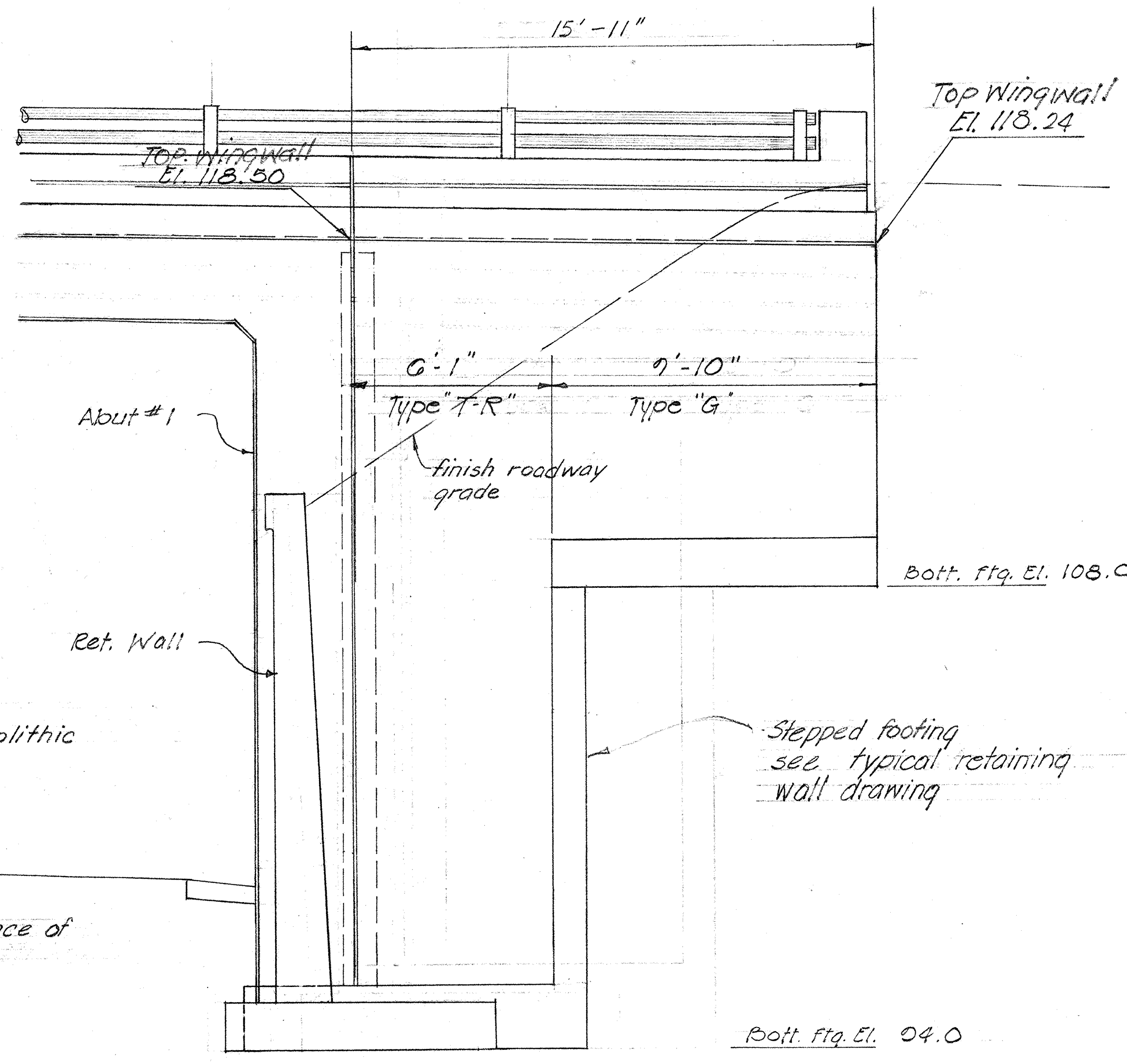
PLAN ~ WING WALL #2

Scale: 1/4" = 1'-0"


6" Drip above
11'-0"
Reference front face WW #4
15'-11"
19'-0"
Footing to be poured monolithic
Wingwall connection see typ. det. sht.# B12
90°
7"
3'-1"
Reference front face Abut. #1
Sta. 12 + 61.00
Reference front face of Retaining Wall.
25'-11"
Retaining Wall #6-IB
℄ 6th Avenue
Reference edge of structure above

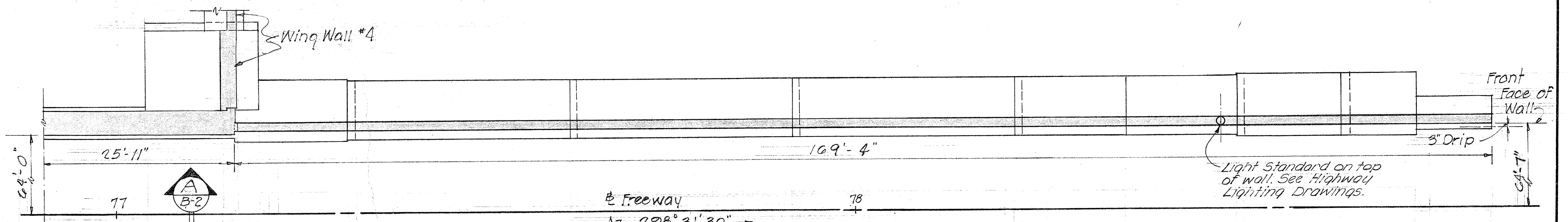
PLAN ~ WING WALL #4

Scale: 1/4" = 1'-0"


15'-11"
Top Wingwall El. 118.24
Top Wingwall El. 118.50
6'-1"
9'-10"
Type "T-R"
Type "G"
Abut #1
finish roadway grade
Bott. Ftg. El. 108.0
Ret. Wall
Stepped footing see typical retaining wall drawing
Bott. Ftg. El. 94.0

ELEVATION - WING WALL #4

Scale: 1/4" = 1'-0"

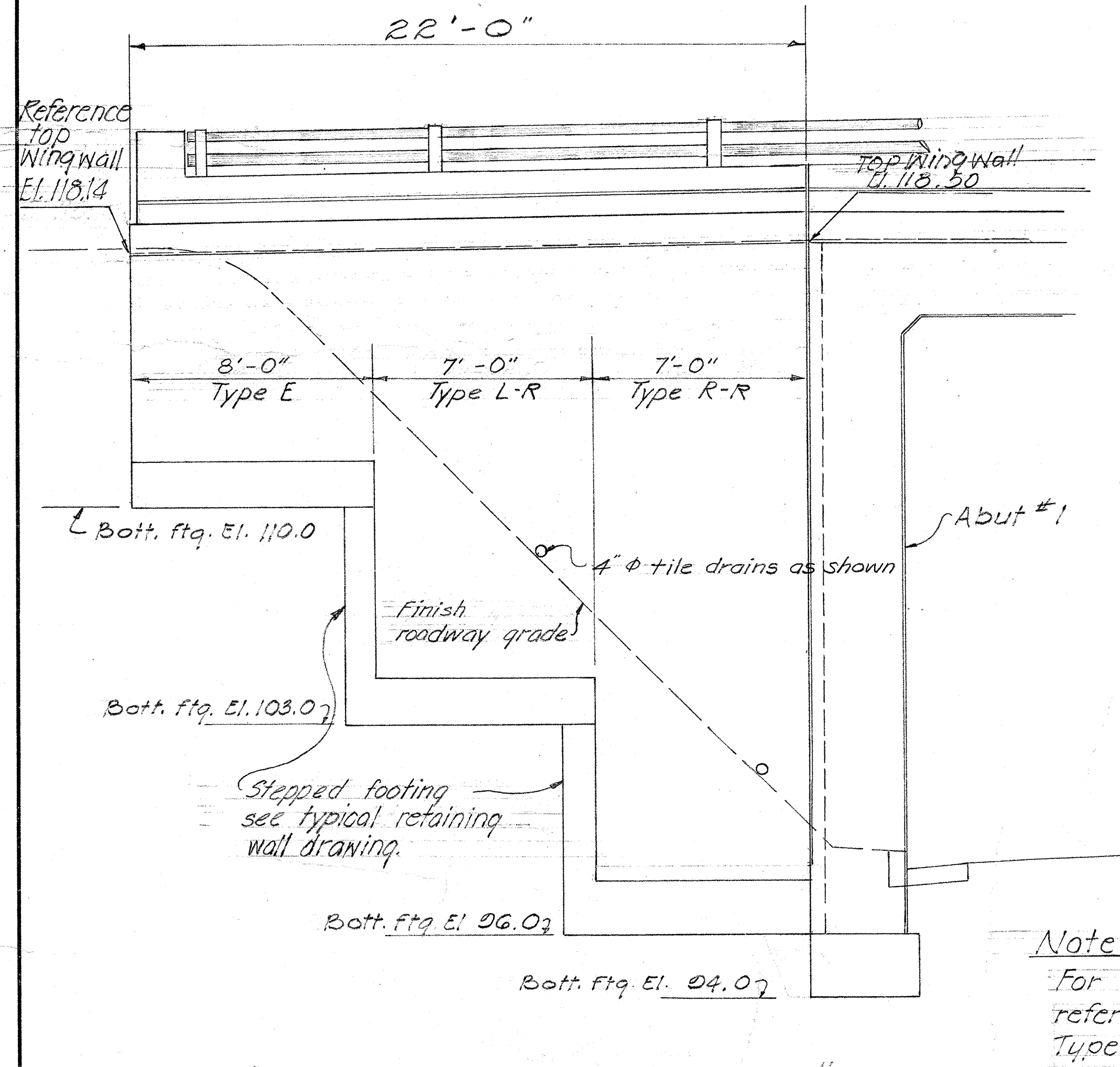

Wing Wall #4
Front Face of Wall
25'-11"
169'-4"
5' Drip
6'-0"
6'-7"
A
B-2
77
℄ Freeway
78
Az. 298° 31' 30"
Light Standard on top of wall. See Highway Lighting Drawings.

PLAN - RETAINING WALL Nº "6 - IB"

TYPE (FOOTING ON ROCK)

Scale: 1" = 10'-0"

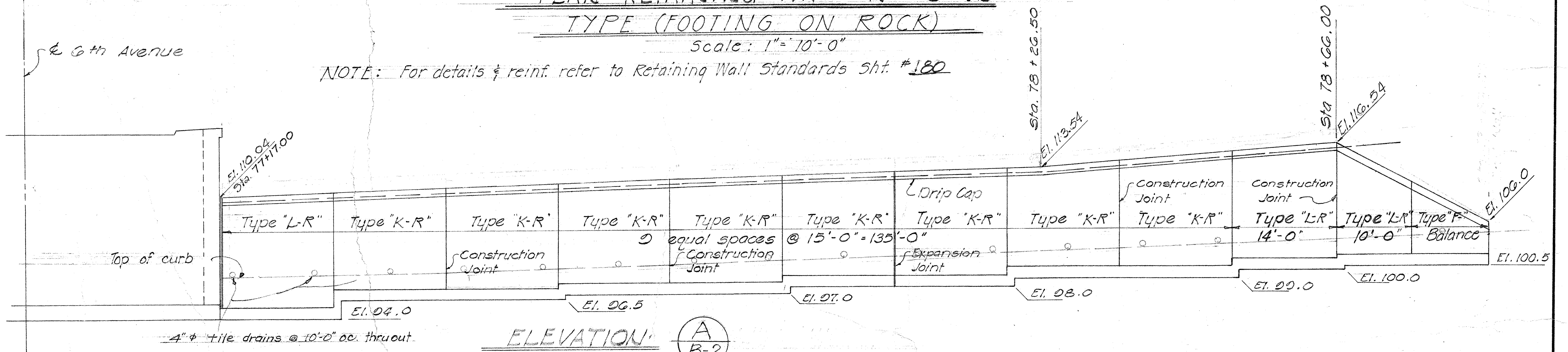
NOTE: For details & reinf. refer to Retaining Wall Standards Sht. #180


22'-0"
Reference top Wingwall El. 118.14
Top Wing Wall El. 118.50
8'-0"
Type E
7'-0"
Type L-R
7'-0"
Type R-R
Abut #1
Bott. Ftg. El. 110.0
4" ϕ tile drains as shown
Finish roadway grade
Bott. Ftg. El. 103.0
Stepped footing see typical retaining wall drawing.
Bott. Ftg. El. 96.0
Bott. Ftg. El. 94.0

ELEVATION ~ WING WALL #2

Scale: 1/4" = 1'-0"

Note:
For Wingwalls #2, #4 details and reinf. refer to Retaining Wall Standards Type (Footing on Rock) Sht. #180


℄ 6th Avenue
El. 110.04
Sta. 77+17.00
Sta. 78 + 26.50
El. 113.54
Sta 78 + 66.00
El. 116.54
El. 106.0
Type "L-R"
Type "K-R"
Type "K-R"
Type "K-R"
Type "K-R"
Type "K-R"
Type "K-R"
Type "K-R"
Type "K-R"
Type "L-R"
Type "L-R"
Type "F"
9 equal spaces @ 15'-0" = 135'-0"
14'-0"
10'-0"
Balance
Drip Cap
Construction Joint
Construction Joint
Construction Joint
Construction Joint
Expansion Joint
Top of curb
El. 100.5
El. 94.0
El. 96.5
El. 97.0
El. 98.0
El. 99.0
El. 100.0
4" ϕ tile drains @ 10'-0" oc. thruout

ELEVATION (A/B-2)

Scale: 1" = 10'-0"

RETAINING WALL Nº "6-IB" ESTIMATED QUANTITIES

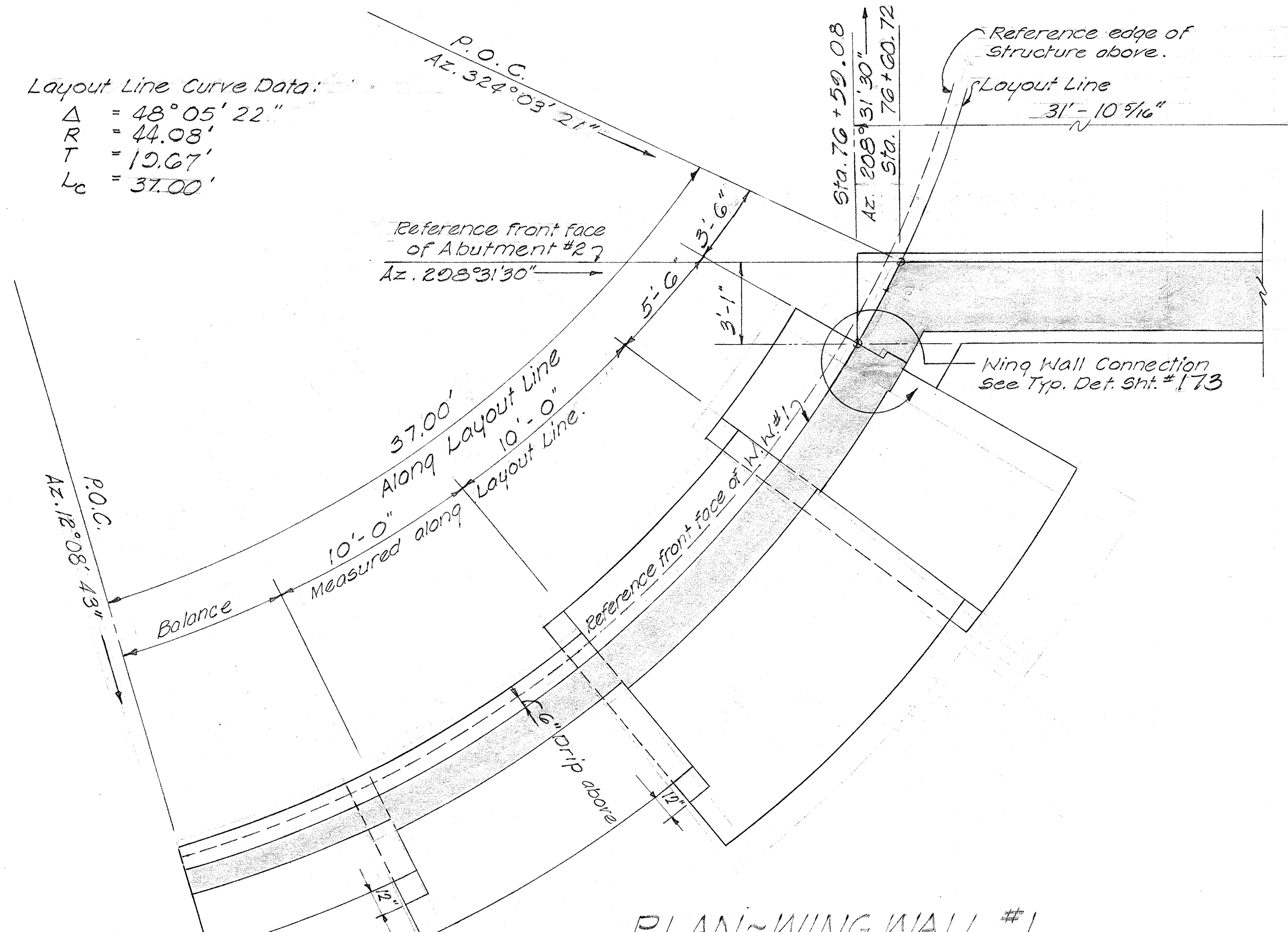
ITEM	TOTALS
Class A-1 Concrete	176 c.y.
Reinforcing Steel	13,584 lbs.
Filter Material	71 c.y.
Structural Excavation	369 c.y.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURE Nº 6
SIXTH AVE. SEPARATION
℄ Sta. 76 + 90.94
LUNALILO FREEWAY PROJ. Nº I-H1-1(4):24
SEPTEMBER 1962

SHEET No. B-2 OF SHEETS

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY DATE
DRAWN BY W. Bailey "
TRACED BY "
DESIGNED BY V.C. S.Y. J.F. "
QUANTITIES BY P. Yamashita "
CHECKED BY J.T.O. "

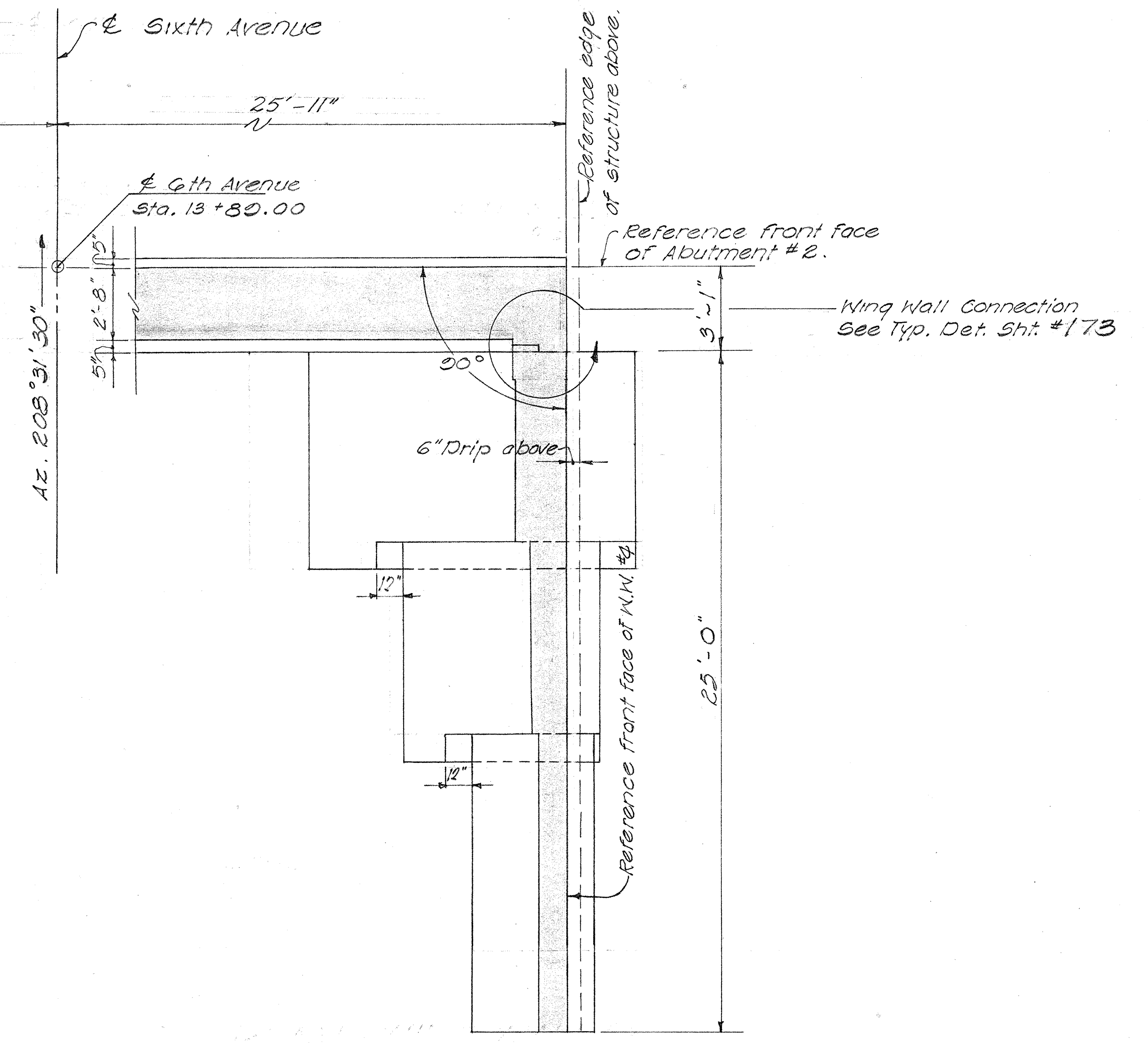
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	164	217



Layout Line Curve Data:
Δ = 48°05'22"
R = 44.08'
T = 19.67'
Lc = 37.00'
P.O.C.
Az. 324°03'21"
Sta. 76+59.08
Az. 208°31'30"
Sta. 76+60.72
Reference edge of structure above.
Layout Line
31'-10 9/16"
Reference front face of Abutment #2
Az. 208°31'30"
3'-6"
5'-6"
3'-1"
Wing Wall Connection See Typ. Det. Sht. #173
37.00' Along Layout Line
10'-0" Measured along Layout Line.
10'-0"
Reference front face of W.W. #1
P.O.C.
Az. 12°08'43"
Balance
6" Drip above
1'
2"

PLAN ~ WING WALL #1

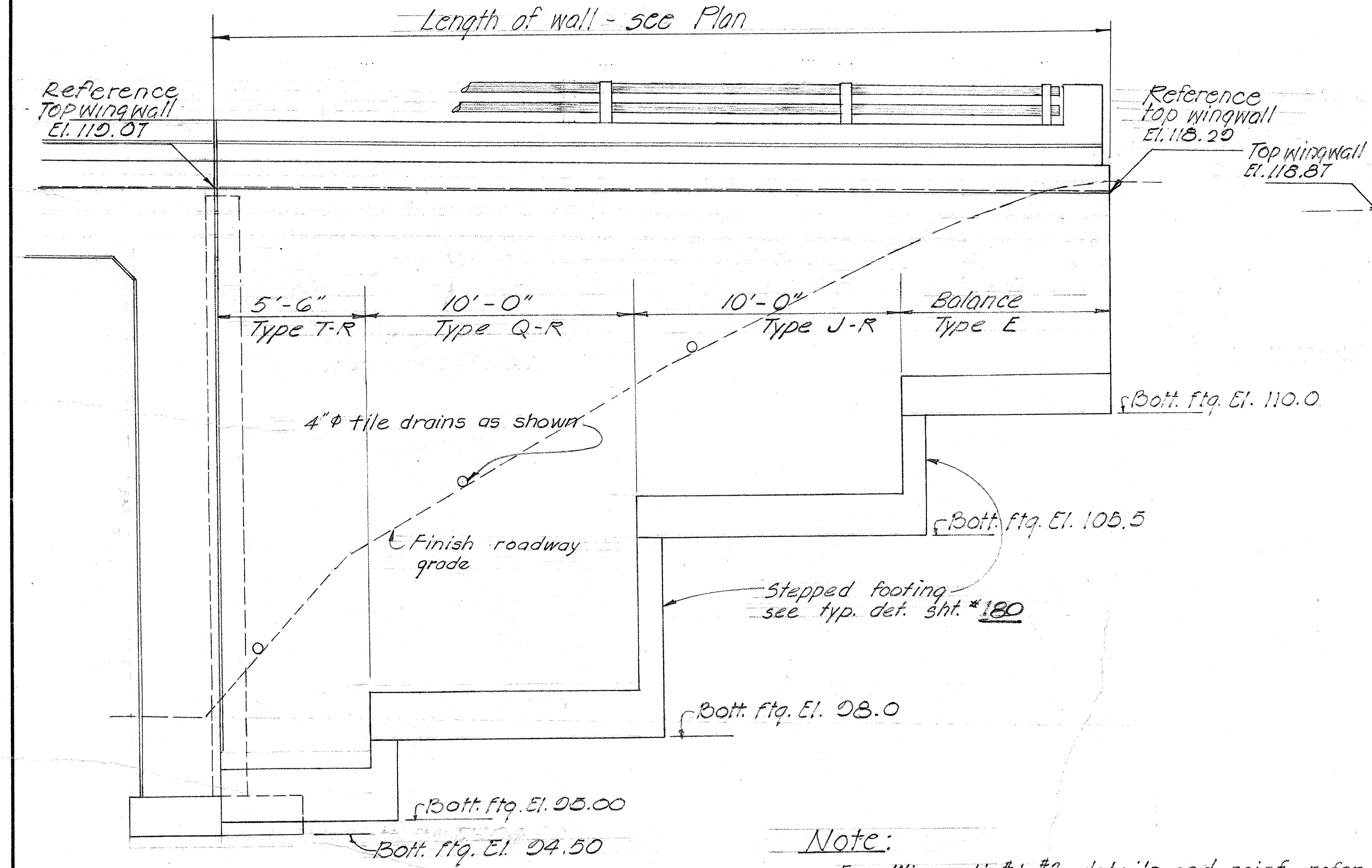
Scale: 1/4" = 1'-0"



℄ Sixth Avenue
25'-11"
Reference edge of structure above.
℄ 6th Avenue Sta. 13+80.00
Reference front face of Abutment #2.
Az. 208°31'30"
5½"
2'-8"
1'-5"
Wing Wall Connection See Typ. Det. Sht. #173
3'-1"
90°
6" Drip above
1'
1½"
Reference front face of W.W. #3
25'-0"

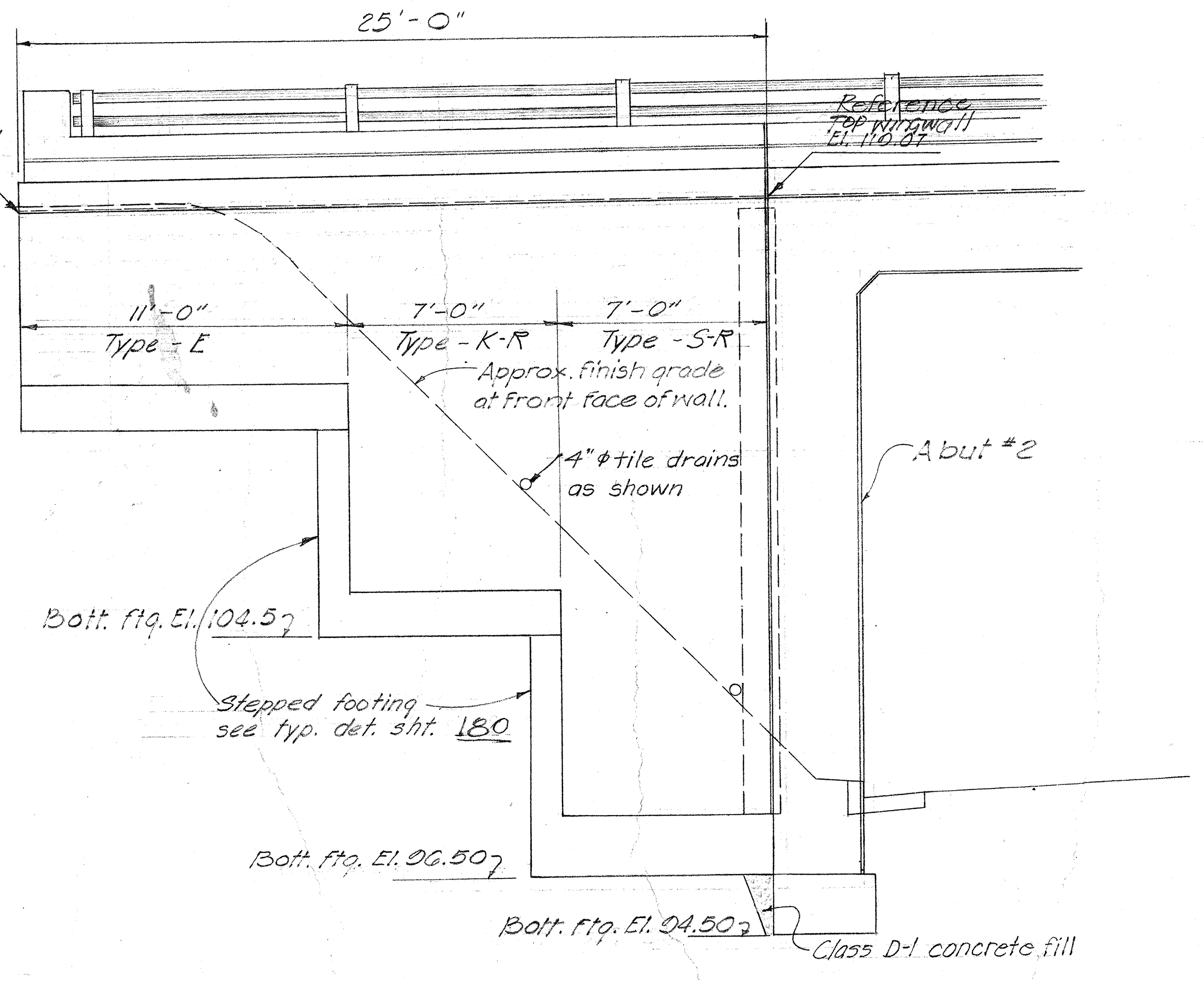
PLAN ~ WING WALL #3

Scale: 1/4" = 1'-0"



Length of wall - see Plan
Reference Top wingwall El. 119.07
Reference top wingwall El. 118.29
5'-6" Type T-R
10'-0" Type Q-R
10'-0" Type J-R
Balance Type E
Bott. Ftg. El. 110.0
4"φ tile drains as shown
Bott. Ftg. El. 105.5
Finish roadway grade
Stepped footing see typ. det. sht. #180
Bott. Ftg. El. 98.0
Bott. Ftg. El. 95.00
Bott. Ftg. El. 94.50

Note:
For Wingwalls #1, #3 details and reinf. refer to Retaining Wall Standards Type (Footing on Rock) Sht. #180



25'-0"
Reference Top wingwall El. 118.87
Top wingwall El. 118.87
11'-0" Type - E
7'-0" Type - K-R
7'-0" Type - S-R
Approx. finish grade at front face of wall.
4"φ tile drains as shown
Abut. #2
Bott. Ftg. El. 104.5
Stepped footing see typ. det. sht. 180
Bott. Ftg. El. 96.50
Bott. Ftg. El. 94.50
Class D-1 concrete fill

ELEVATION ~ WING WALL #1

Scale: 1/4" = 1'-0"

ELEVATION ~ WING WALL #3

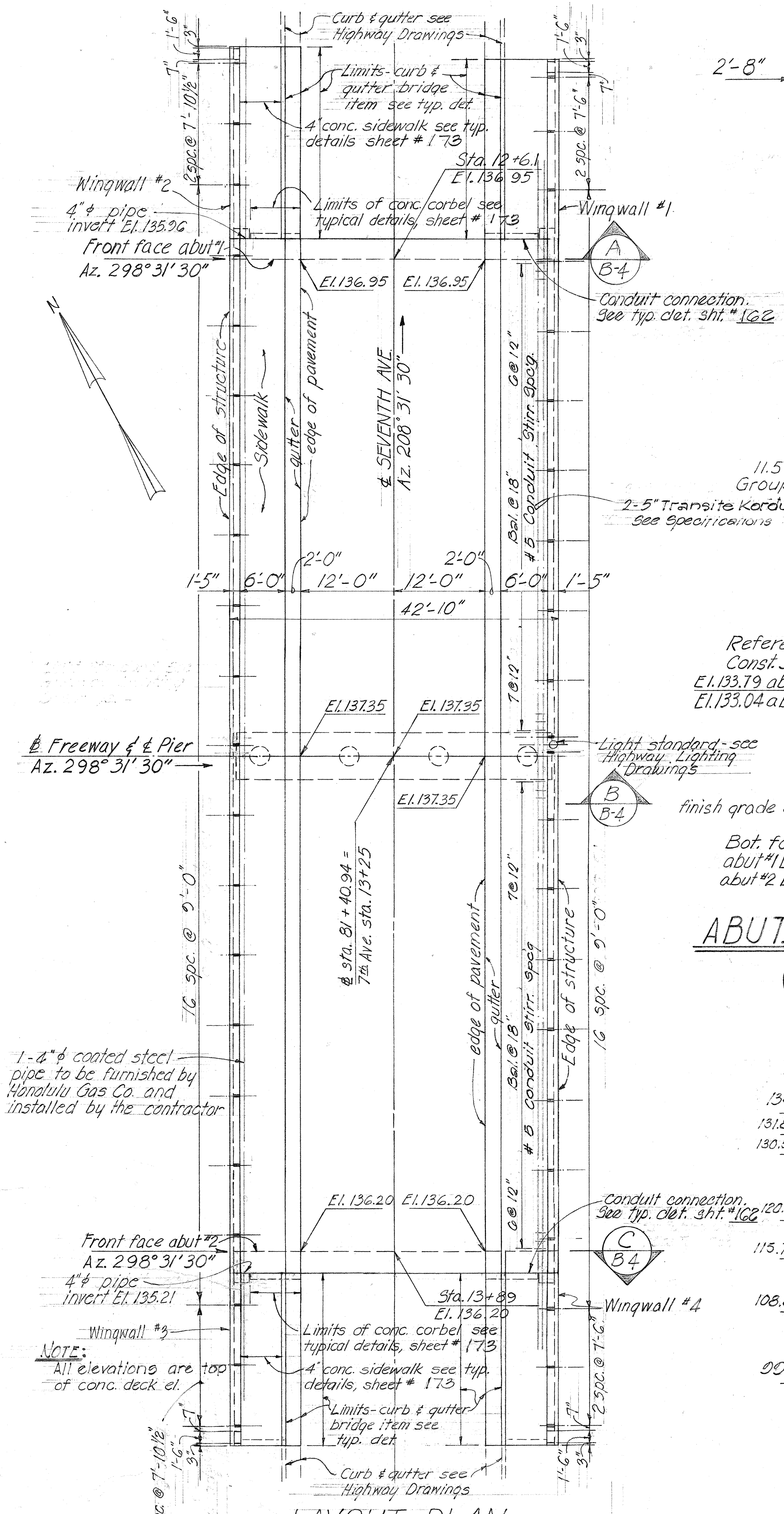
Scale: 1/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURE No 6
SIXTH AVE. SEPARATION
℄ Sta. 76 + 90.94
Lunalilo Freeway Proj. No I-HI-1(4):24
SEPT. 1962

SHEET No. 8-3 OF SHEETS

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY DATE
DRAWN BY S. Yong "
TRACED BY "
DESIGNED BY V.C. "
QUANTITIES BY S.Y. J.F. "
CHECKED BY P. Yamashita J.T.O. "

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	165	217

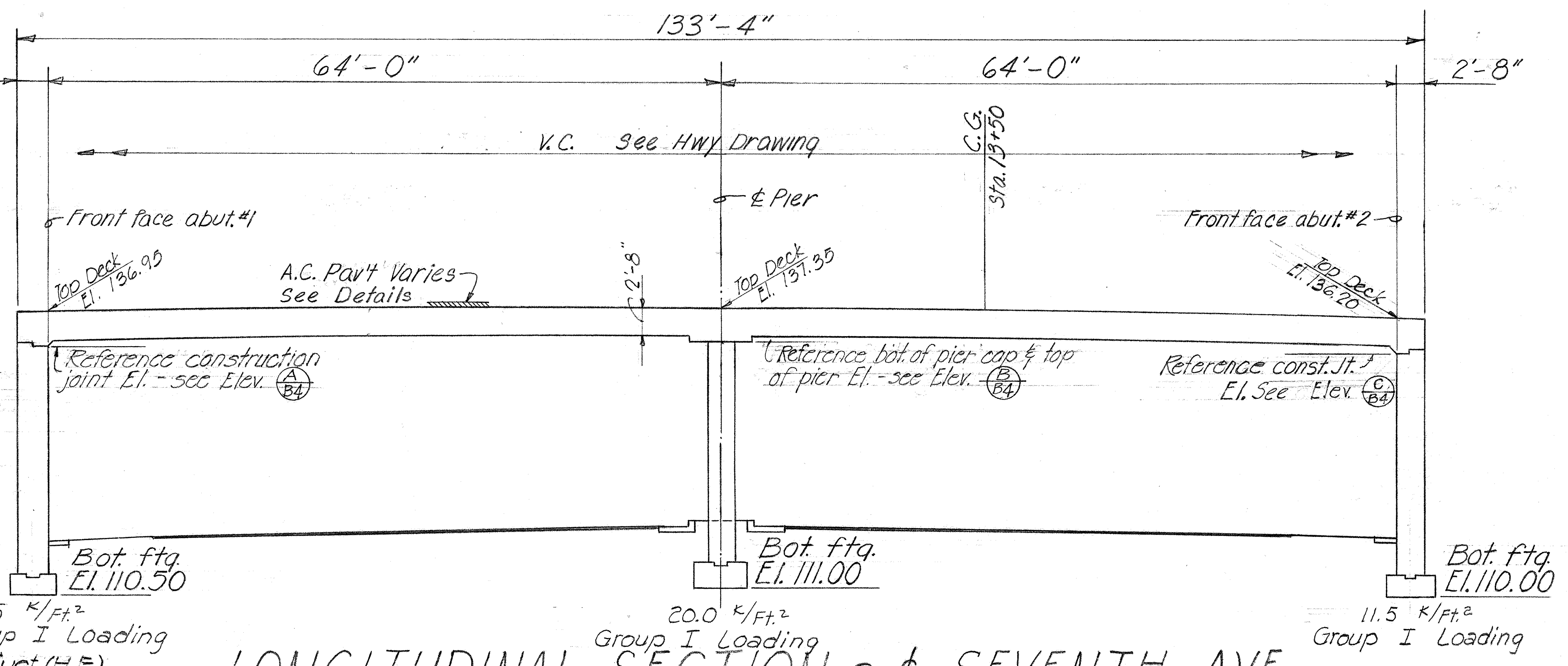


Curb & gutter see Highway Drawings
Limits-curb & gutter bridge item see typ. det.
4" conc. sidewalk see typ. details sheet # 173
Sta. 12+6.1
El. 136.95
Wingwall #2
4" ⌀ pipe invert El. 135.96
Limits of conc. corbel see typical details, sheet # 173
Wingwall #1
Front face abut #1
Az. 298° 31' 30"
El. 136.95
El. 136.95
Conduit connection. See typ. det. sht. # 162
A
B-4
Edge of structure
sidewalk
gutter
edge of pavement
℄ SEVENTH AVE.
Az. 208° 31' 30"
G @ 12"
Conduit Stirr. spcg.
3 Sol @ 18"
# 5 Conduit Stirr. spcg.
2-5" Transite Korduct (H.E.)
See specifications
2 spc. @ 7'-10½"
2 spc. @ 7'-6"
1'-6"
3"
1'-5"
6'-0"
2'-0"
12'-0"
12'-0"
2'-0"
6'-0"
1'-5"
42'-10"
El. 137.35
El. 137.35
℄ Freeway & ℄ Pier
Az. 298° 31' 30"
Light standard - see Highway Lighting Drawings
El. 137.35
B
B-4
℄ sta. 81+40.94 = 7th Ave. sta. 13+25
7 @ 12"
16 spc. @ 9'-0"
edge of pavement
gutter
Edge of structure
3 Sol @ 18"
# 5 Conduit Stirr. spcg.
1-4" ⌀ coated steel pipe to be furnished by Honolulu Gas Co. and installed by the contractor
El. 136.20
El. 136.20
Conduit connection. See typ. det. sht. # 162
C
B4
Front face abut #2
Az. 298° 31' 30"
4" ⌀ pipe invert El. 135.21
Sta. 13+89
El. 136.20
Wingwall #4
Wingwall #3
Limits of conc. corbel see typical details, sheet # 173
4" conc. sidewalk see typ. details, sheet # 173
Limits-curb & gutter bridge item see typ. det.
Curb & gutter see Highway Drawings
2 spc. @ 7'-10½"
2 spc. @ 7'-6"

NOTE: All elevations are top of conc. deck el.

LAYOUT PLAN

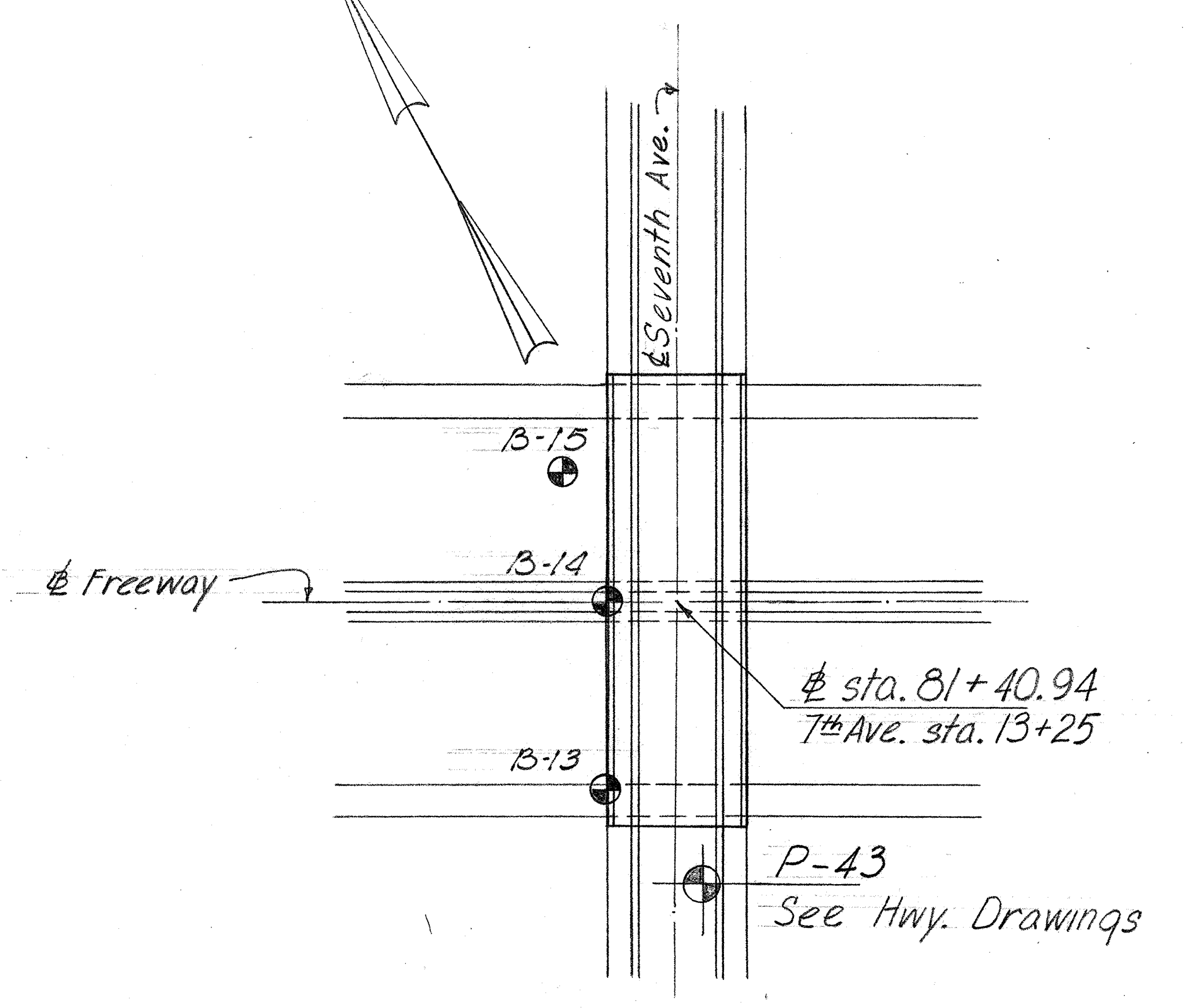
Scale: 1" = 10'-0"



133'-4"
2'-8"
64'-0"
64'-0"
2'-8"
V.C. See Hwy Drawing
C.G. Sta. 13+50
℄ Pier
Front face abut. #1
Front face abut. #2
Top Deck El. 136.95
A.C. Pav't Varies See Details
2'-8"
Top Deck El. 137.35
Top Deck El. 136.20
Reference construction joint El. - see Elev. A/B4
Reference bot. of pier cap & top of pier El. - see Elev. B/B4
Reference const. Jt. El. See Elev. C/B4
Bot. ftg. El. 110.50
Bot. ftg. El. 111.00
Bot. ftg. El. 110.00
11.5 K/Ft.² Group I Loading
20.0 K/Ft.² Group I Loading
11.5 K/Ft.² Group I Loading

LONGITUDINAL SECTION @ ℄ SEVENTH AVE.

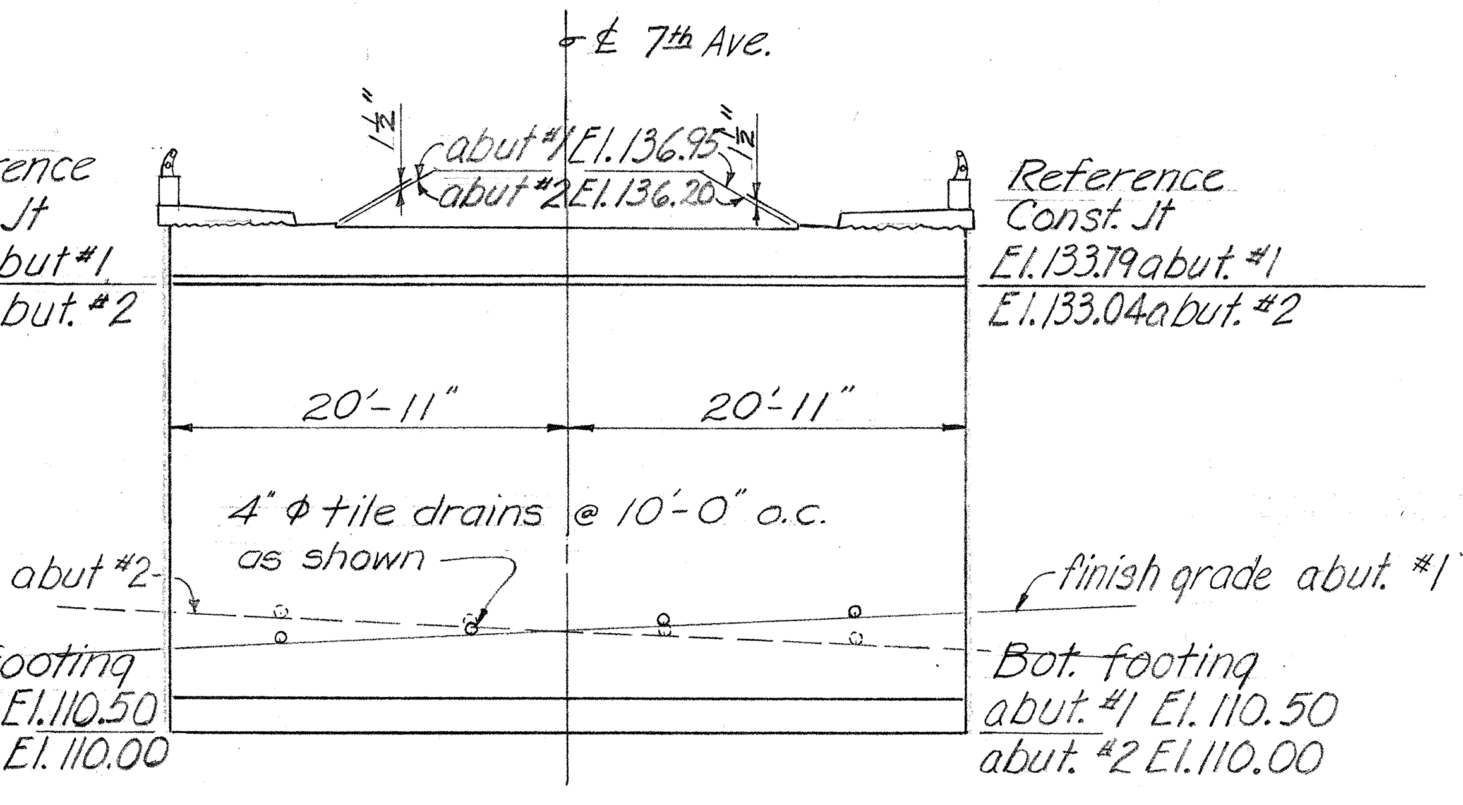
Scale: 1" = 10'-0"



N
℄ Seventh Ave.
B-15
B-14
B-13
℄ Freeway
℄ sta. 81+40.94
7th Ave. sta. 13+25
P-43
See Hwy. Drawings

LOCATION PLAN

scale: 1" = 50'-0"

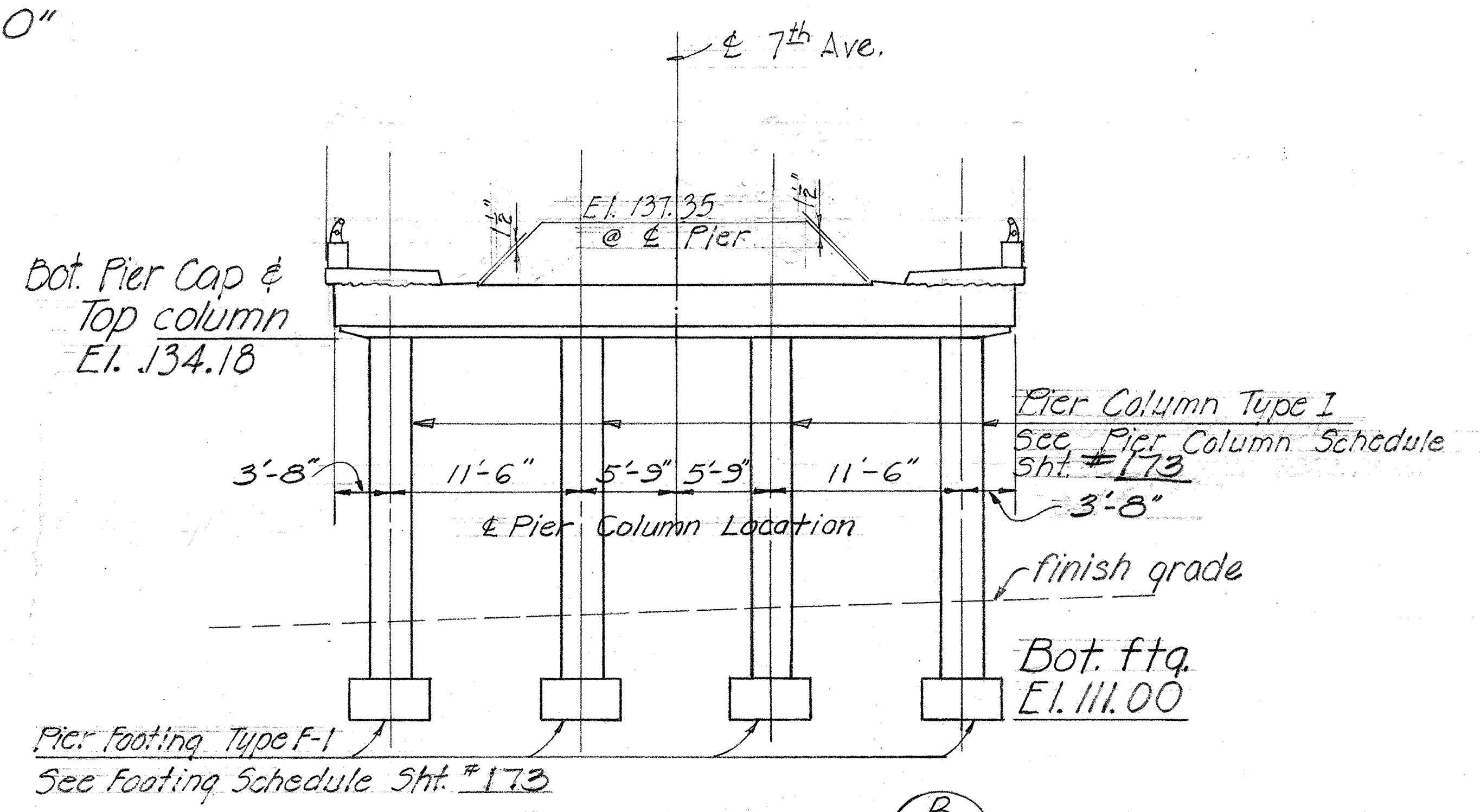


℄ 7th Ave.
½"
abut #1 El. 136.95
abut #2 El. 136.20
Reference Const. Jt El. 133.79 abut #1
El. 133.04 abut #2
Reference Const. Jt El. 133.79 abut #1
El. 133.04 abut #2
20'-11"
20'-11"
4" ⌀ tile drains @ 10'-0" o.c. as shown
finish grade abut #2
finish grade abut. #1
Bot. footing abut #1 El. 110.50
abut #2 El. 110.00
Bot. footing abut. #1 El. 110.50
abut. #2 El. 110.00

ABUT. #1 ELEVATION (A/B4) AS SHOWN

(ABUT #2 ELEVATION (C/B4) SIMILAR EXCEPT AS OTHERWISE NOTED)

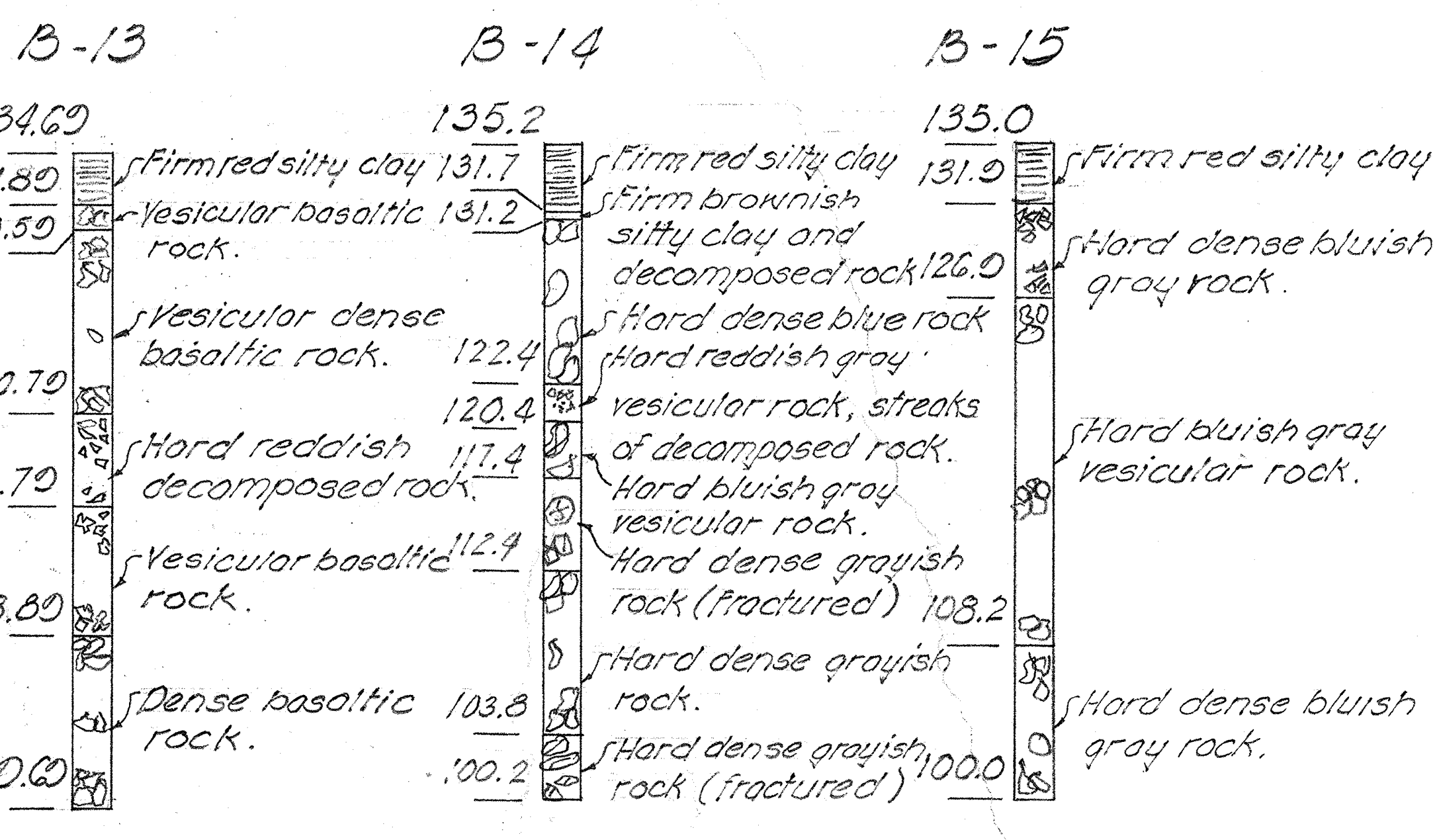
Scale: 1" = 10'-0"



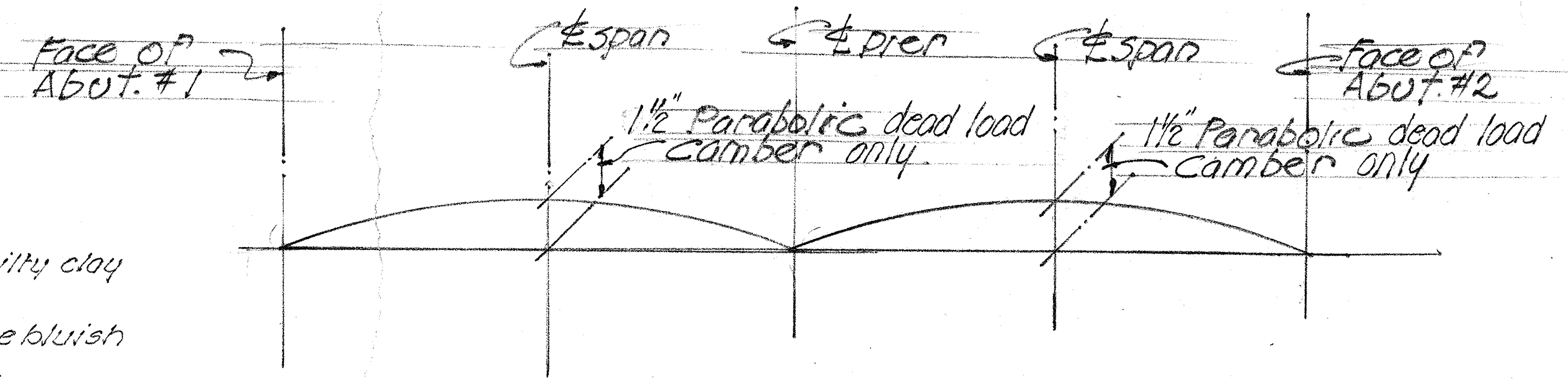
℄ 7th Ave.
El. 137.35 @ ℄ Pier
½"
Bot. Pier Cap & Top column El. 134.18
Pier Column Type I
See Pier Column Schedule Sht. # 173
3'-8"
11'-6"
5'-9"
5'-9"
11'-6"
3'-8"
℄ Pier Column Location
finish grade
Bot. ftg. El. 111.00
Pier footing Type F-1
See Footing Schedule Sht. # 173

PIER ELEVATION (B/B4)

Scale: 1" = 10'-0"



B-13
134.69
131.89
130.59
120.79
115.79
108.89
99.69
Firm red silty clay
Vesicular basaltic rock.
Vesicular dense basaltic rock.
Hard reddish decomposed rock.
Vesicular basaltic rock.
Dense basaltic rock.
B-14
135.2
131.7
131.2
122.4
117.4
112.9
103.8
100.2
Firm red silty clay
Firm brownish silty clay and decomposed rock
Hard dense blue rock
Hard reddish gray vesicular rock, streaks of decomposed rock.
Hard bluish gray vesicular rock.
Hard dense grayish rock (fractured)
Hard dense grayish rock.
Hard dense grayish rock (fractured)
B-15
133.0
131.9
126.0
108.2
100.0
Firm red silty clay
Hard dense bluish gray rock.
Hard bluish gray vesicular rock.
Hard dense bluish gray rock.



Face of Abut. #1
℄ span
℄ pier
℄ span
Face of Abut. #2
1½" Parabolic dead load camber only.
1½" Parabolic dead load camber only

CAMBER DIAGRAM - NO SCALE

ESTIMATED QUANTITIES

Class A-1 conc.	Lump Sum	(271 c.y.)
Reinforcing Steel	Lump Sum	(152,296 lbs.)
Structural Excavation	520	c.y.
Asphaltic Paving Mix No. V	31	tons
Asphaltic Paving Mix No III	24	tons
Bituminous Tack Coat	89	gals.
Filter Material	82	c.y.
Concrete Railing	357	lin. ft.
Metal Bridge Railing	351	lin. ft.

Reference Notes:
Top concrete deck to follow ℄ roadway profile grade.
For Typical Details see Sht. # 173
For General Notes see Sht. # 173
For frame superstructure reinforcing & details see Sht. # 167

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY — DATE
DRAWN BY I. Miyashiro
TRACED BY
DESIGNED BY G.K.
QUANTITIES BY T.M. S.Y.
CHECKED BY P. Yamashita J.T.O.

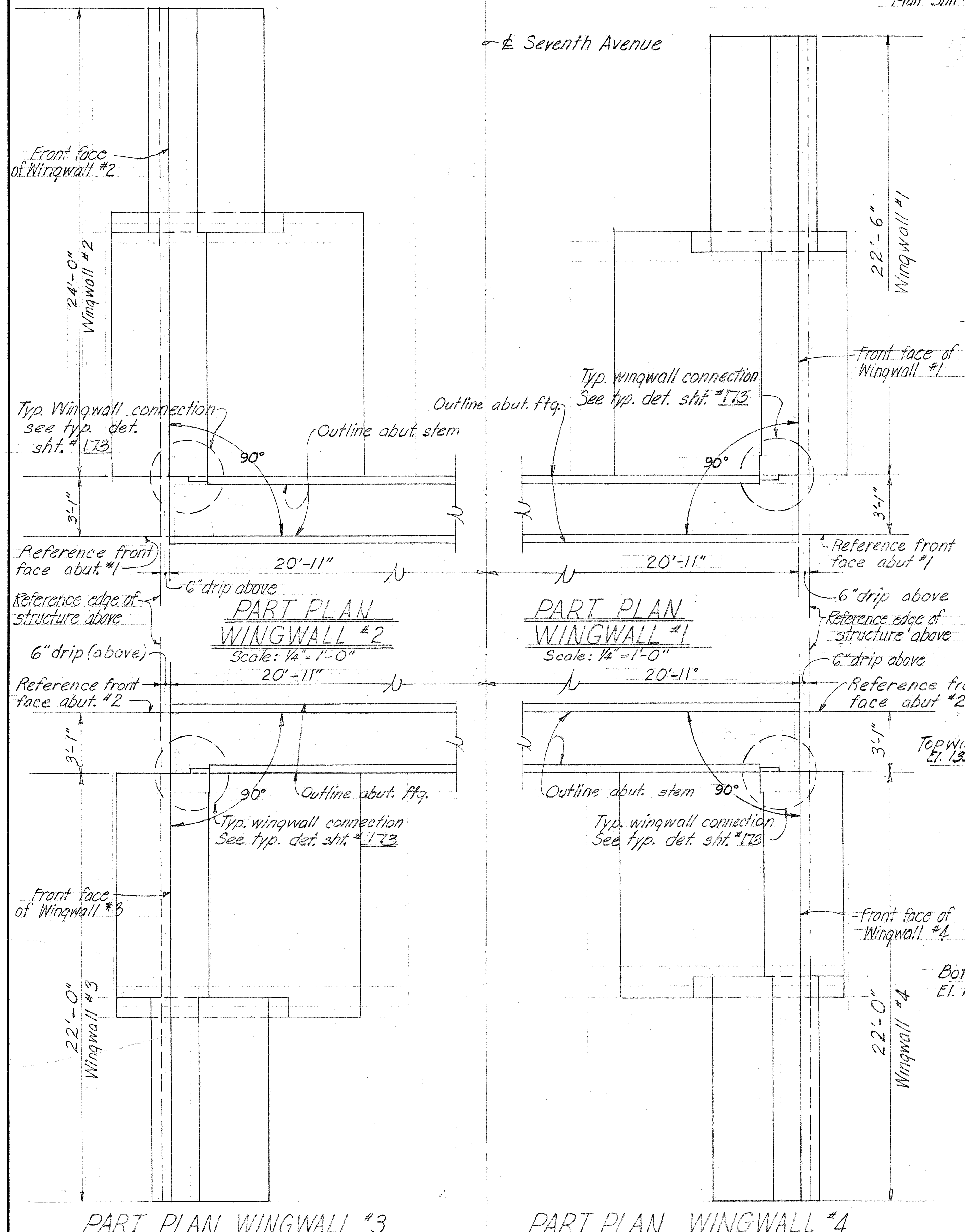
APPROVED:
Nakamura Kan — DATE 5/1/63
PRINCPL. DISTR. ENG'R., H.E. Co. Ltd. — DATE
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURE Nº 7
SEVENTH AVE. SEPARATION
Base Line Sta. 81 + 40.94
Lunalilo Freeway   Proj. Nº I-HI-1(4):24
SEPT. 1962

SHEET No. B4 OF SHEETS

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	166	217

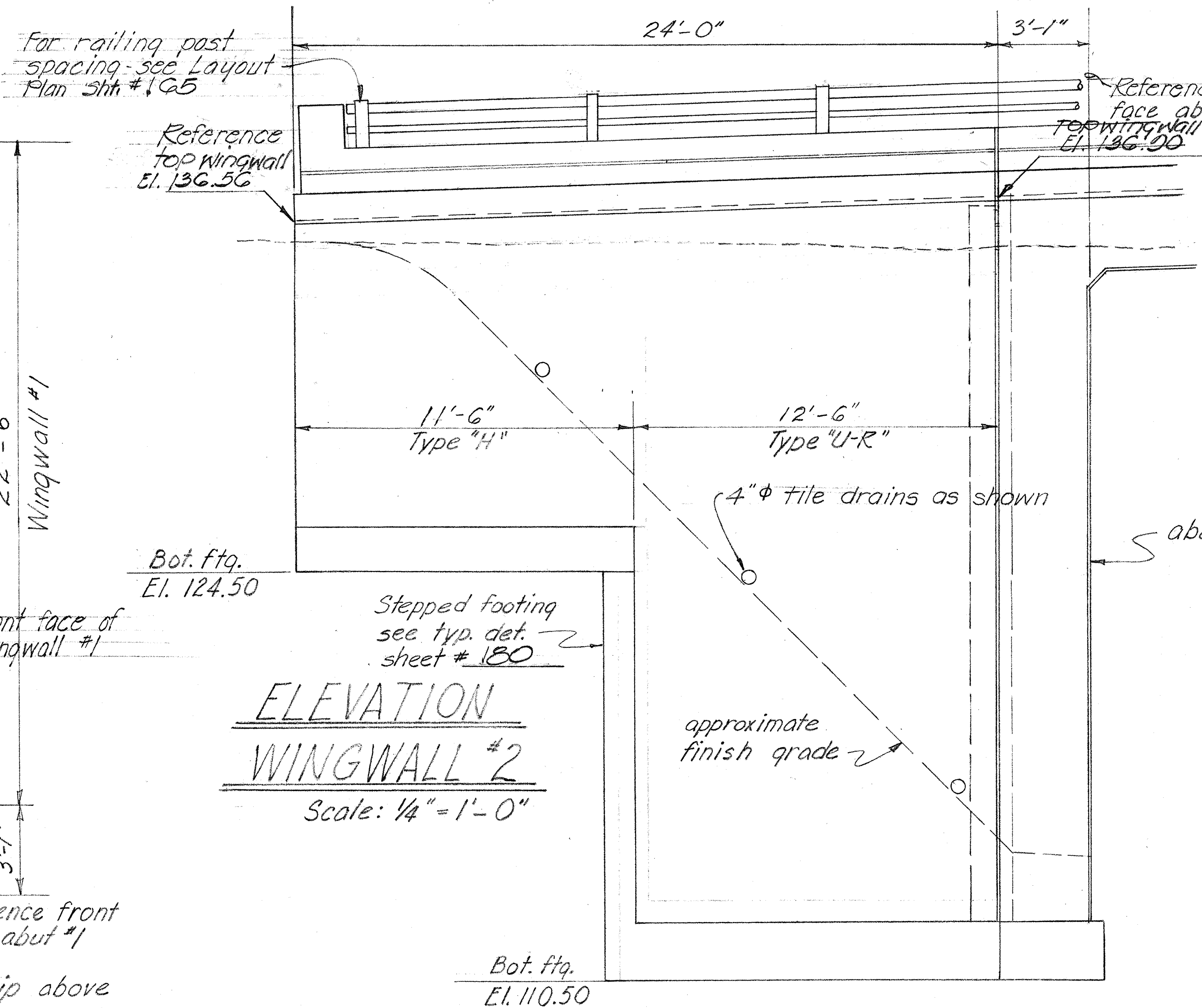

Front face of Wingwall #2
24'-0"
Wingwall #2
℄ Seventh Avenue
22'-6"
Wingwall #1
Front face of Wingwall #1
Typ. wingwall connection See typ. det. sht. #173
Outline abut. ftg.
Typ. Wingwall connection see typ. det. sht. # 173
Outline abut stem
90°
90°
3'-1"
3'-1"
Reference front face abut. #1
20'-11"
20'-11"
Reference front face abut #1
6" drip above
6" drip above
Reference edge of structure above
Reference edge of structure above
6" drip (above)
6" drip above
Reference front face abut. #2
20'-11"
20'-11"
Reference front face abut #2
3'-1"
3'-1"
90°
Outline abut. ftg.
Outline abut. stem
90°
Typ. wingwall connection See typ. det. sht. # 173
Typ. wingwall connection See typ. det. sht. #173
Front face of Wingwall #3
Front face of Wingwall #4
22'-0"
Wingwall #3
22'-0"
Wingwall #4

PART PLAN WINGWALL #2
Scale: 1/4" = 1'-0"

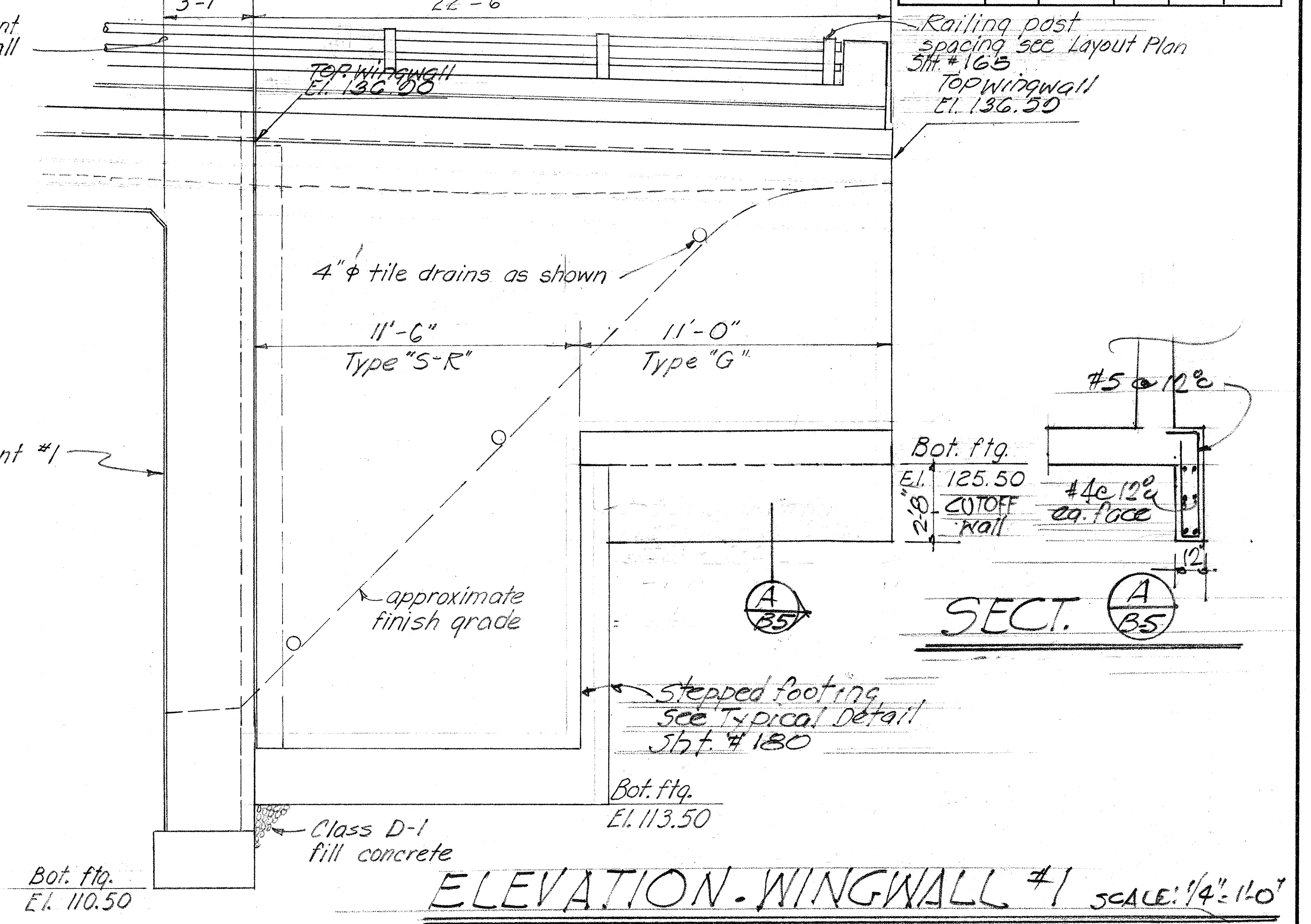
PART PLAN WINGWALL #1
Scale: 1/4" = 1'-0"

PART PLAN WINGWALL #3
Scale: 1/4" = 1'-0"

PART PLAN WINGWALL #4
Scale: 1/4" = 1'-0"

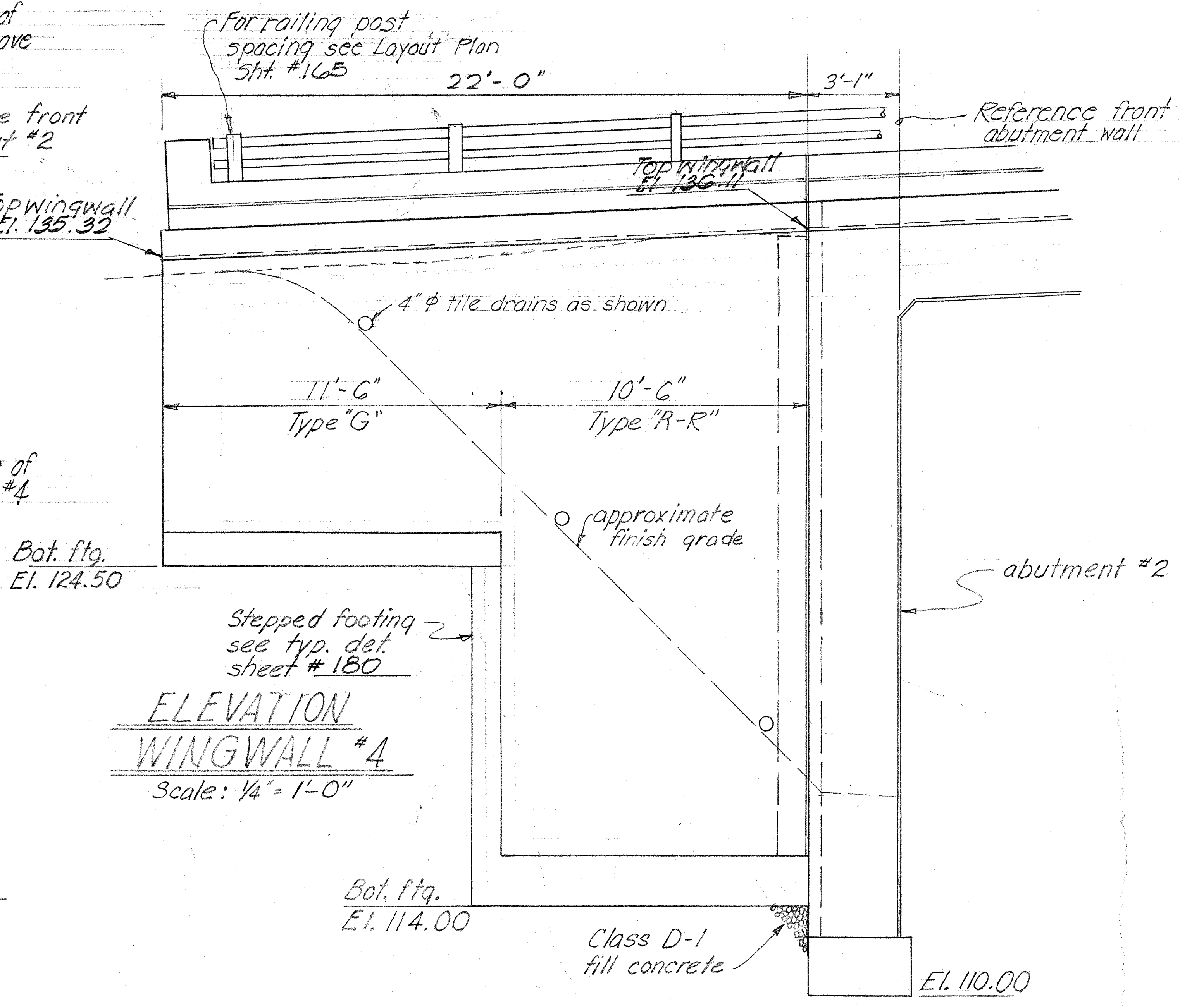

For railing post spacing see Layout Plan Sht. #165
24'-0"
3'-1"
Reference front face abut. wall
Reference Top wingwall El. 136.36
Top wingwall El. 136.00
11'-6"
Type "H"
12'-6"
Type "U-R"
4" φ tile drains as shown
abutment #1
Bot. ftg. El. 124.50
Stepped footing see typ. det. sheet # 180
approximate finish grade
Bot. ftg. El. 110.50

ELEVATION WINGWALL #2
Scale: 1/4" = 1'-0"

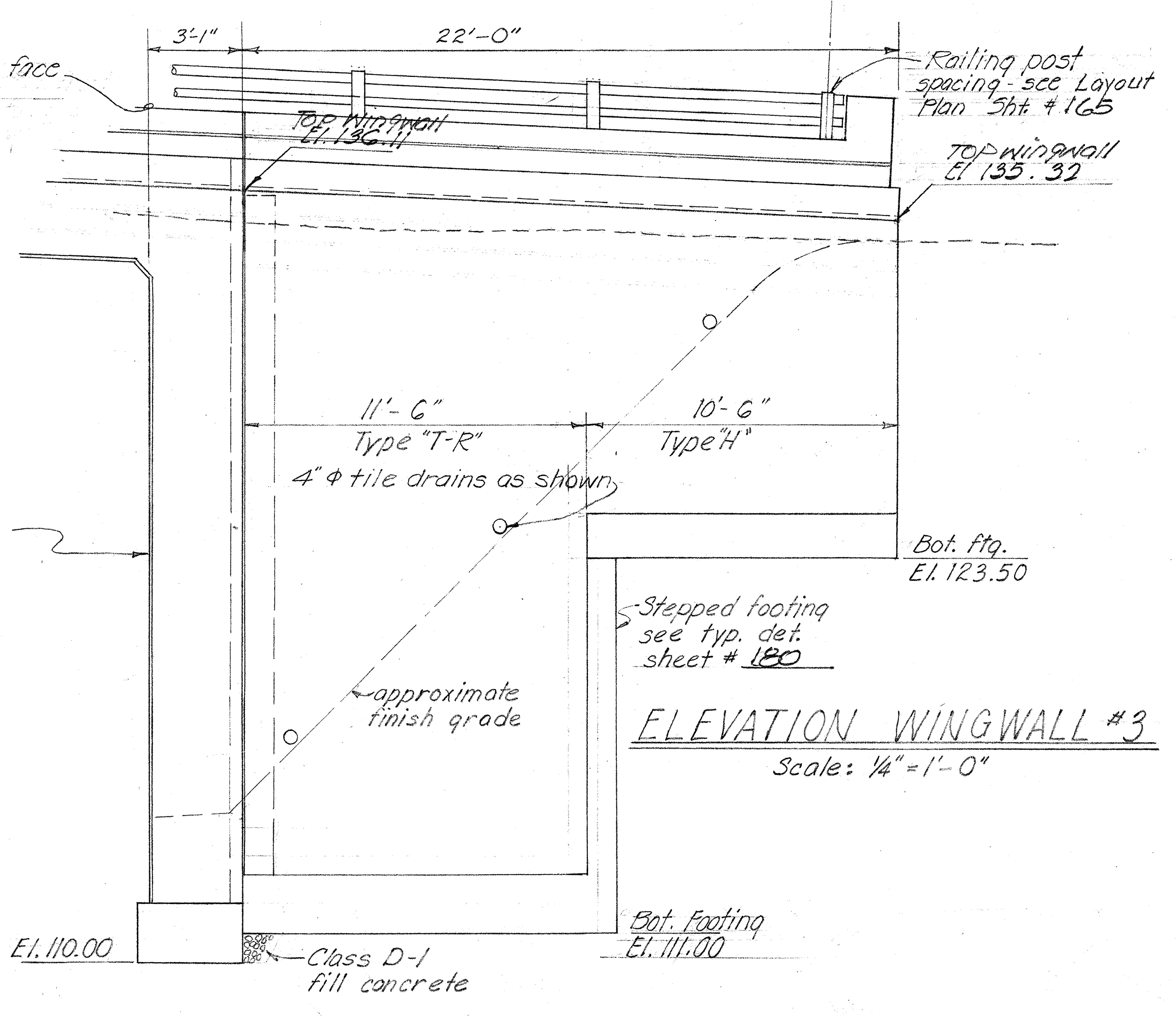

3'-1"
22'-6"
Railing post spacing see Layout Plan Sht. #165
Top wingwall El. 136.00
Top wingwall El. 136.50
4" φ tile drains as shown
11'-6"
Type "S-R"
11'-0"
Type "G"
#5 @ 12"
Bot. ftg. El. 125.50
2'-3"
#4 @ 12" ea. face
Cutoff wall
1'-0"
A
B5
approximate finish grade
Stepped footing See Typical Detail Sht. # 180
Bot. ftg. El. 113.50
Class D-1 fill concrete
Bot. ftg. El. 110.50

SECT. A/B5

ELEVATION - WINGWALL #1 SCALE: 1/4" = 1'-0"


For railing post spacing see Layout Plan Sht. #165
22'-0"
3'-1"
Reference front face abutment wall
Top wingwall El. 136.11
Top wingwall El. 135.32
4" φ tile drains as shown
11'-6"
Type "G"
10'-6"
Type "R-R"
approximate finish grade
abutment #2
Bot. ftg. El. 124.50
Stepped footing see typ. det. sheet # 180
Bot. ftg. El. 114.00
Class D-1 fill concrete
El. 110.00

ELEVATION WINGWALL #4
Scale: 1/4" = 1'-0"


3'-1"
22'-0"
Railing post spacing see Layout Plan Sht. # 165
Top wingwall El. 136.11
Top wingwall El. 135.32
11'-6"
Type "T-R"
10'-6"
Type "H"
4" φ tile drains as shown
Bot. ftg. El. 123.50
Stepped footing see typ. det. sheet # 180
approximate finish grade
El. 110.00
Class D-1 fill concrete
Bot. Footing El. 111.00

ELEVATION WINGWALL #3
Scale: 1/4" = 1'-0"

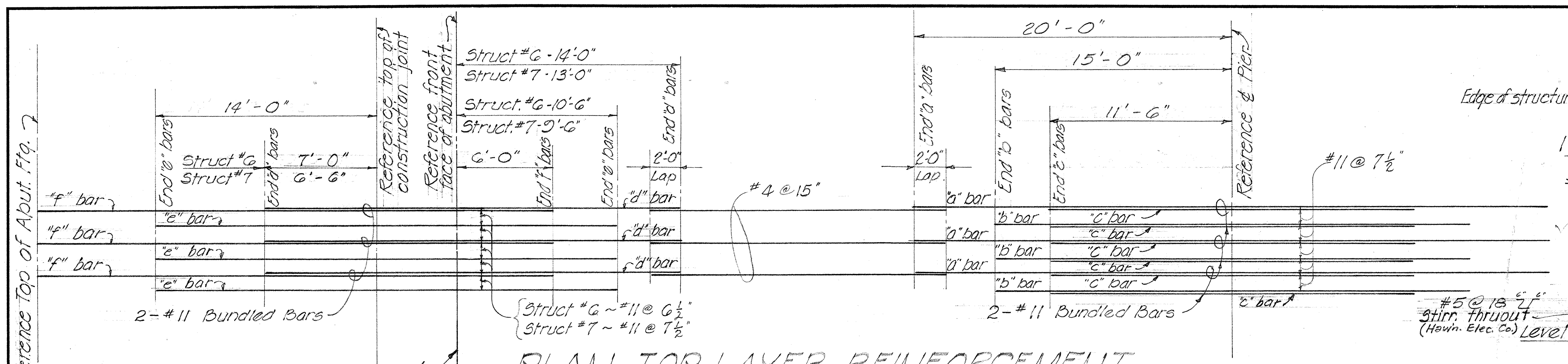
Note:
For Wingwalls #1, #2, #3, & #4 details & reinf. refer to Retaining Wall Standards Type (Footing on Rock) Sht. # 180

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURE Nº 7
SEVENTH AVE. SEPARATION
Base Line Sta. 81 + 40.94
Lunalilo Freeway Proj. Nº I-H1-1(4):24
SEPT. 1962

SHEET No. B-5 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY T. Miyashiro	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY G.K.	"
	QUANTITIES BY N.Y. S.Y.	"
No.	CHECKED BY R. Yamashita J.T.O.	"

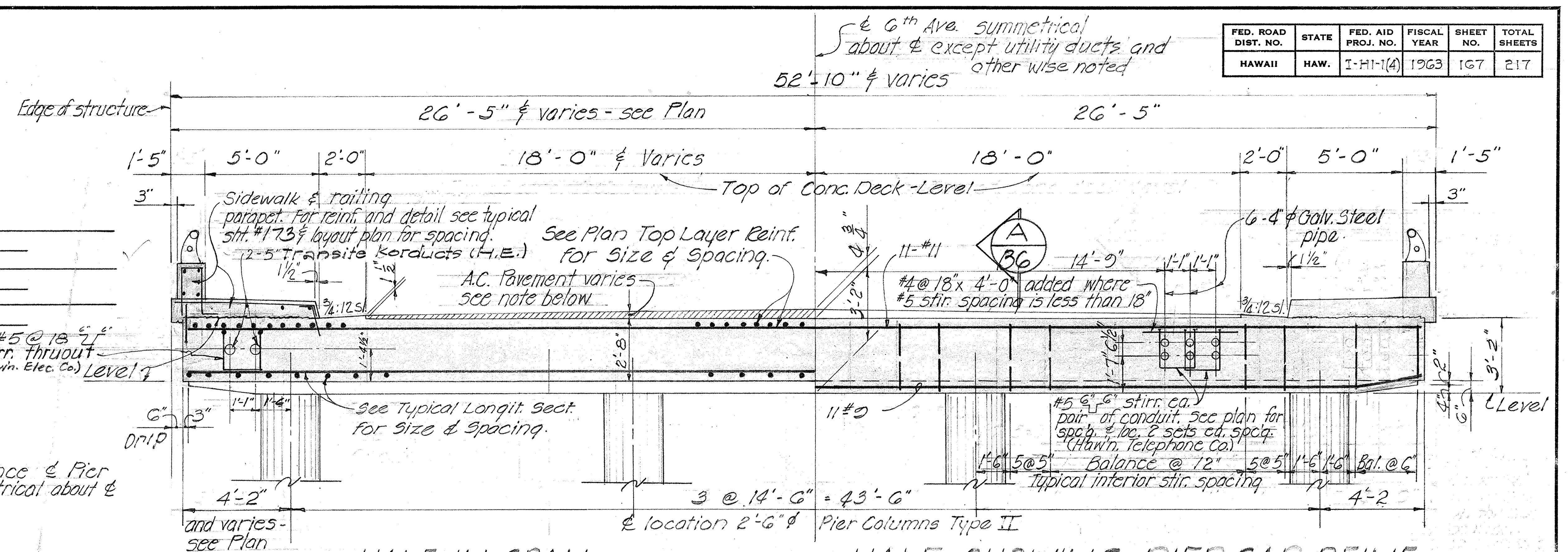
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	167	217



Reference Top of Abut. Ftg.
14'-0"
Struct #6
Struct #7
7'-0"
6'-6"
6'-0"
End "e" bars
End "f" bars
End "k" bars
End "d" bars
Reference top of construction joint
Reference front face of abutment
Struct #6 - 14'-0"
Struct #7 - 13'-0"
Struct #6 - 10'-6"
Struct #7 - 9'-6"
2'-0"
Lap
"f" bar
"e" bar
"d" bar
2-#11 Bundled Bars
Struct #6 ~ #11 @ 6½"
Struct #7 ~ #11 @ 7½"
#4 @ 15"
20'-0"
15'-0"
11'-6"
End "a" bars
End "b" bars
End "c" bars
Reference ℄ Pier
"a" bar
"b" bar
"c" bar
#11 @ 7½"

PLAN TOP LAYER REINFORCEMENT

No scale



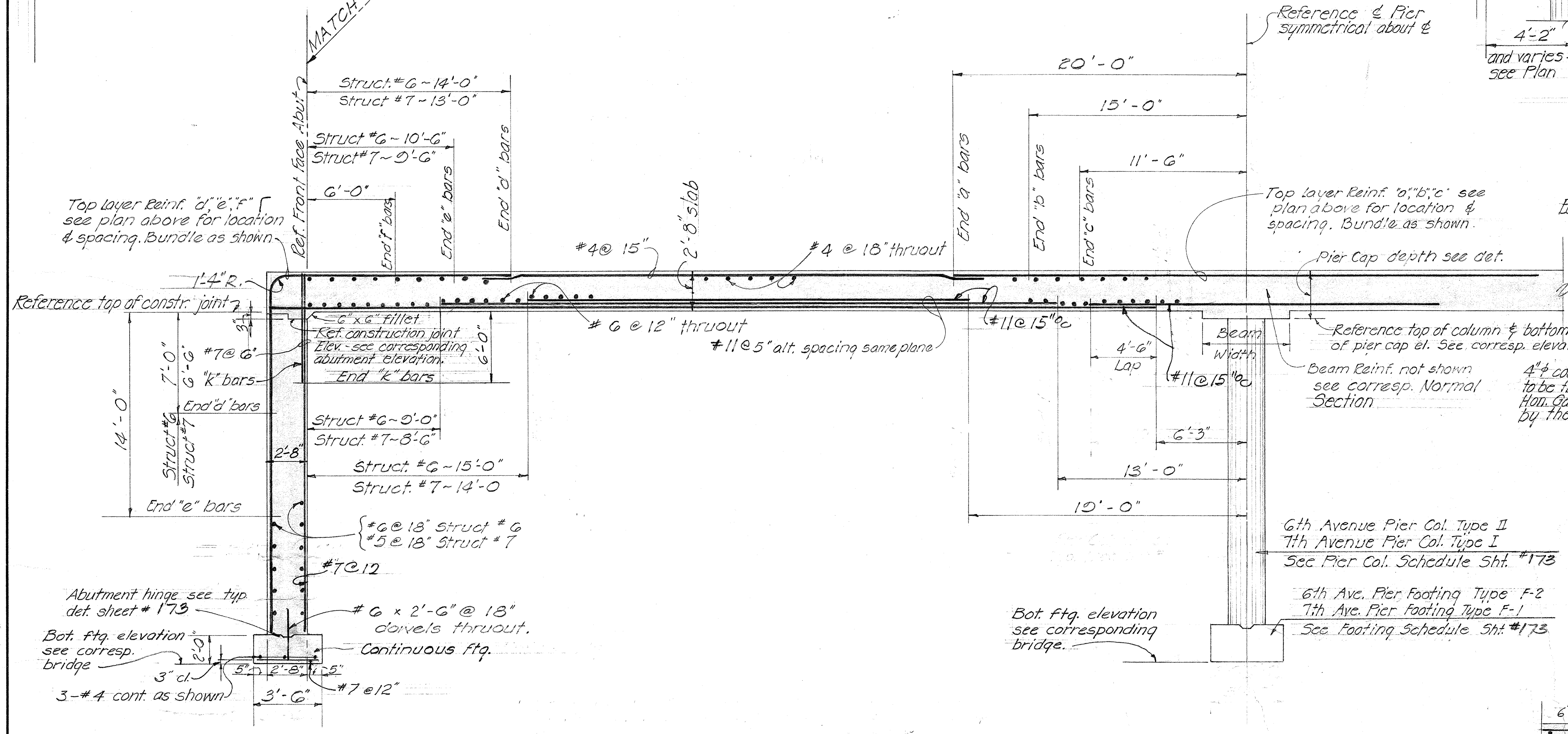
℄ 6th Ave. symmetrical about ℄ except utility ducts and other wise noted
52'-10" & varies
Edge of structure
26'-5" & varies - see Plan
26'-5"
1'-5"
5'-0"
2'-0"
18'-0" & Varies
18'-0"
Top of Conc. Deck - Level
Sidewalk & railing parapet. For reinf. and detail see typical sht. #173 & layout plan for spacing.
2-5" Transite Kerducts (H.E.)
See Plan Top Layer Reinf. for Size & Spacing.
A.C. Pavement varies - see note below.
#5 @ 18" stirr. thruout (Hawn. Elec. Co.)
Level
Drip
See Typical Longit. Sect. for Size & Spacing.
4'-2" and varies - see Plan
3 @ 14'-6" = 43'-6"
℄ location 2'-6"∅ Pier Columns Type II
11-#11
11-#9
A B6
#4 @ 18" x 4'-0" added where #5 stir. spacing is less than 18"
14'-9"
6-4"∅ Galv. Steel pipe
#5 stirr. ea. pair of conduit. See plan for spcg. & Inc. 2 sets ea. spcg. (Hawn. Telephone Co.)
Balance @ 12"
Typical interior stir. spacing
4'-2"
3'-2"
Level

HALF IN SPAN HALF SHOWING PIER CAP REINF.

NORMAL SECTION ~ STRUCTURE #6

Scale: ¼" = 1'-0"

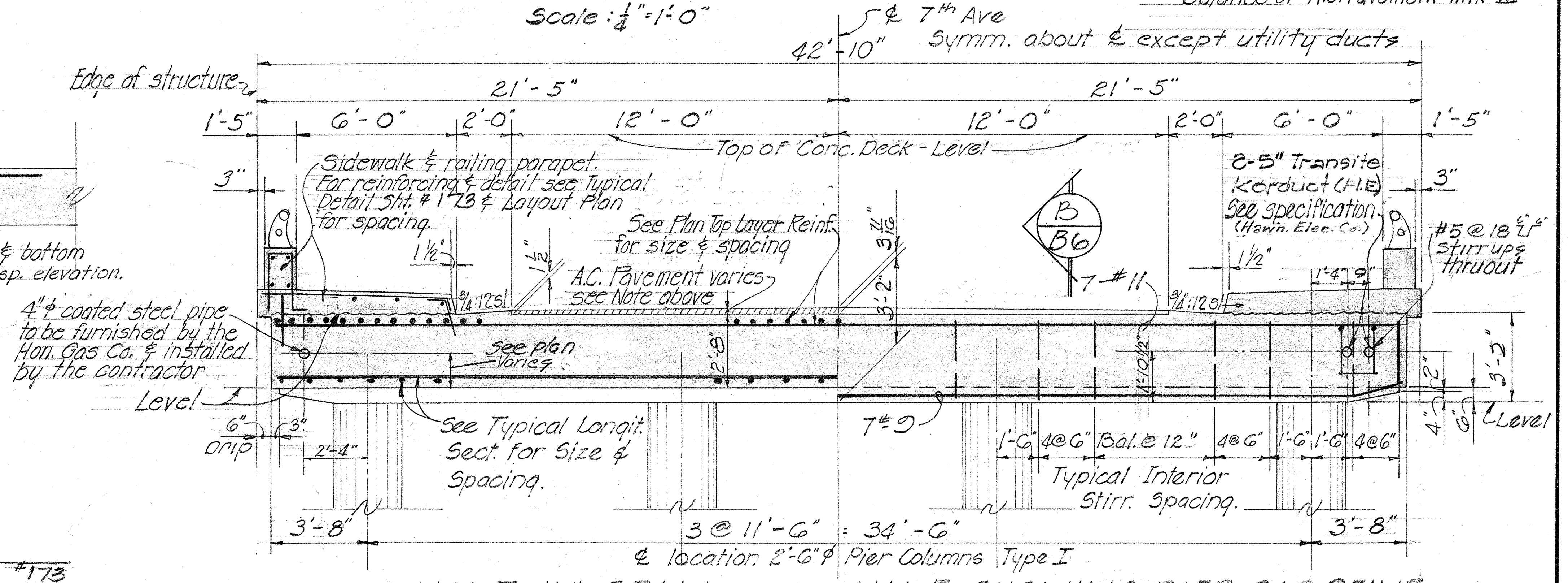
Note: Top 1½" of A.C. Pavement Mix V Balance of A.C. Pavement Mix III



MATCH LINE
Struct #6 ~ 14'-0"
Struct #7 ~ 13'-0"
Ref. Front face Abut.
Struct #6 ~ 10'-6"
Struct #7 ~ 9'-6"
6'-0"
End "f" bars
End "e" bars
End "d" bars
Top layer Reinf. "d","e","f" see plan above for location & spacing. Bundle as shown.
1'-4" R.
Reference top of constr. joint
6" x 6" fillet
Ref. construction joint Elev. - see corresponding abutment elevation.
#7 @ 6"
"k" bars
End "k" bars
End "d" bars
7'-0"
6'-6"
14'-0"
Struct #6
Struct #7
End "e" bars
2'-8"
Struct #6 ~ 9'-0"
Struct #7 ~ 8'-6"
Struct #6 ~ 15'-0"
Struct #7 ~ 14'-0"
#6 @ 18" Struct #6
#5 @ 18" Struct #7
#7 @ 12
Abutment hinge see typ. det. sheet #173
Bot. ftg. elevation see corresp. bridge
3" cl.
3-#4 cont. as shown
#6 x 2'-6" @ 18" dowels thruout.
Continuous Ftg.
3'-6"
#7 @ 12"
#4 @ 15"
2'-8" slab
#4 @ 18" thruout
#6 @ 12" thruout
#11 @ 5" alt. spacing same plane
20'-0"
15'-0"
11'-6"
End "a" bars
End "b" bars
End "c" bars
#11 @ 15"
4'-6"
Lap
#11 @ 15"
6'-3"
13'-0"
19'-0"
Beam Width
Reference ℄ Pier symmetrical about ℄
Top layer Reinf. "a","b","c" see plan above for location & spacing. Bundle as shown.
Pier Cap depth see det.
Reference top of column & bottom of pier cap el. See corresp. elevation.
Beam Reinf. not shown see corresp. Normal Section
6th Avenue Pier Col. Type II
7th Avenue Pier Col. Type I
See Pier Col. Schedule Sht. #173
6th Ave. Pier Footing Type F-2
7th Ave. Pier Footing Type F-1
See Footing Schedule Sht. #173
Bot. ftg. elevation see corresponding bridge.

TYPICAL LONGITUDINAL SECTION ALONG ℄ 6th OR 7th AVENUE

Scale: 3/16" = 1'-0"

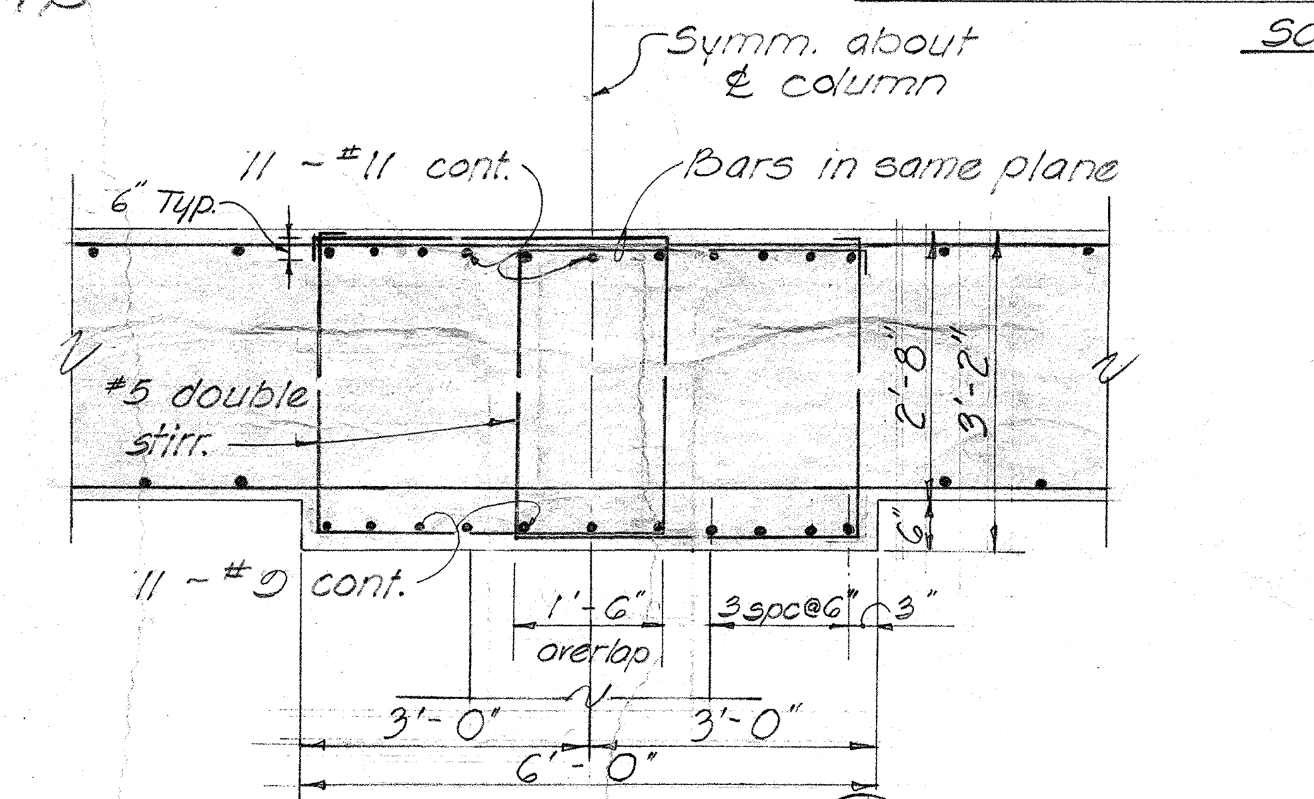


℄ 7th Ave Symm. about ℄ except utility ducts
42'-10"
Edge of structure
21'-5"
21'-5"
1'-5"
6'-0"
2'-0"
12'-0"
Top of Conc. Deck - Level
Sidewalk & railing parapet. For reinforcing & detail see typical Detail Sht. #173 & Layout Plan for spacing.
See Plan Top Layer Reinf. for size & spacing
A.C. Pavement varies - see Note above
See plan varies
4"∅ coated steel pipe to be furnished by the Han. Gas Co. & installed by the contractor
Level
Drip
See Typical Longit. Sect. for Size & Spacing.
3'-8"
3 @ 11'-6" = 34'-6"
℄ location 2'-6"∅ Pier Columns Type I
B B6
7-#11
7-#9
2-5" Transite Kerduct (H.E.) See specification (Hawn. Elec. Co.)
#5 @ 18" stirrups thruout
Bal. @ 12"
Typical Interior Stirr. Spacing.
3'-8"
Level

HALF IN SPAN HALF SHOWING PIER CAP REINF.

NORMAL SECTION ~ STRUCTURE #7

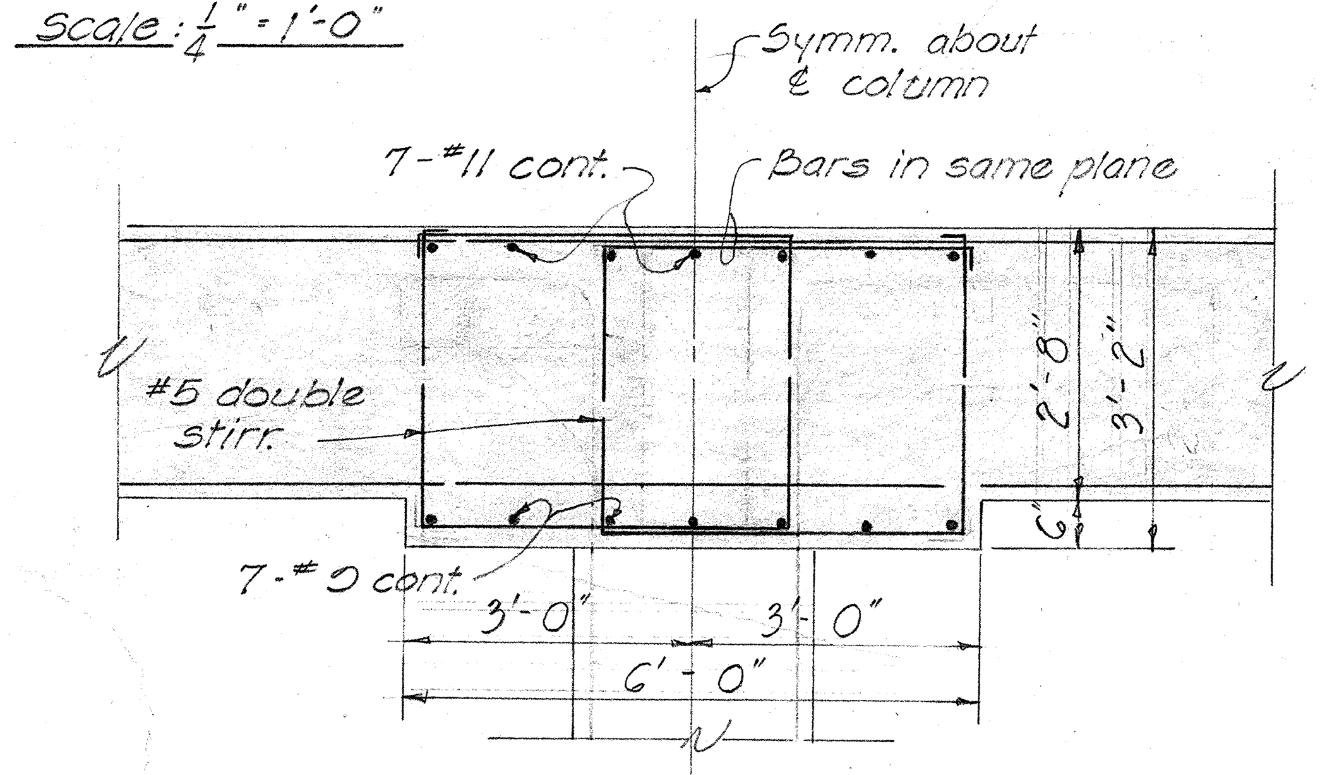
Scale: ¼" = 1'-0"



Symm. about ℄ column
11-#11 cont.
Bars in same plane
6" Typ.
#5 double stirr.
2'-8"
3'-2"
11-#9 cont.
1'-6" overlap
3 spc @ 6" = 3"
3'-0"
3'-0"
6'-0"

SECTION (A/B6)

Scale: ½" = 1'-0"



Symm. about ℄ column
7-#11 cont.
Bars in same plane
#5 double stirr.
2'-8"
3'-2"
7-#9 cont.
3'-0"
3'-0"
6'-0"

SECTION (B/B6)

Scale: ½" = 1'-0"

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY S. Yang
TRACED BY
DESIGNED BY V. Ching, G. Kiyabu
QUANTITIES BY
CHECKED BY P. Yashita J.T.O.
DATE 2-63

APPROVED:

Norman C. Kaw DATE 5/1/63
PRINCPL. DISTR. ENG'R., H.E.Co. Ltd. DATE

DATE 4-30-63
PLANT ENG'G. SUPV., H.T.Co., Ltd. DATE

DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SECTION & DETAILS

6TH & 7TH AVE. SEPARATION

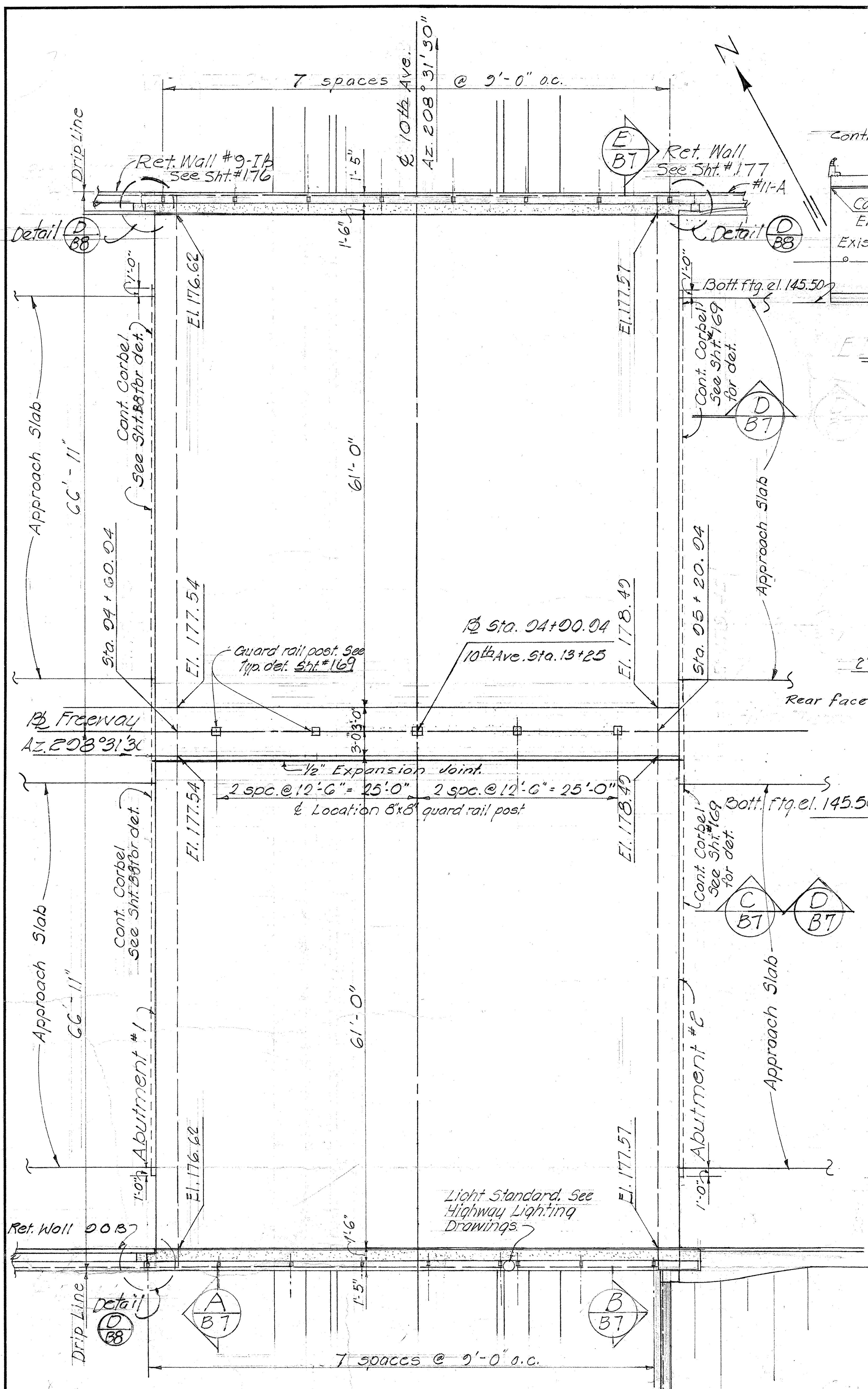
LUNALILO FREEWAY Proj. No. I-H1-1(4):24
SEPT. 1962

SHEET No. B-6 OF SHEETS

PRINTED ON CLEARPRINT 1000-H

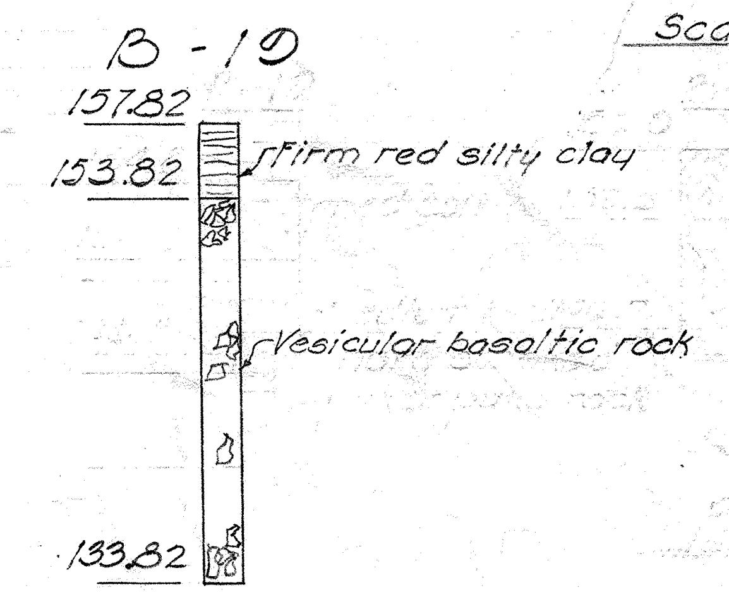
167

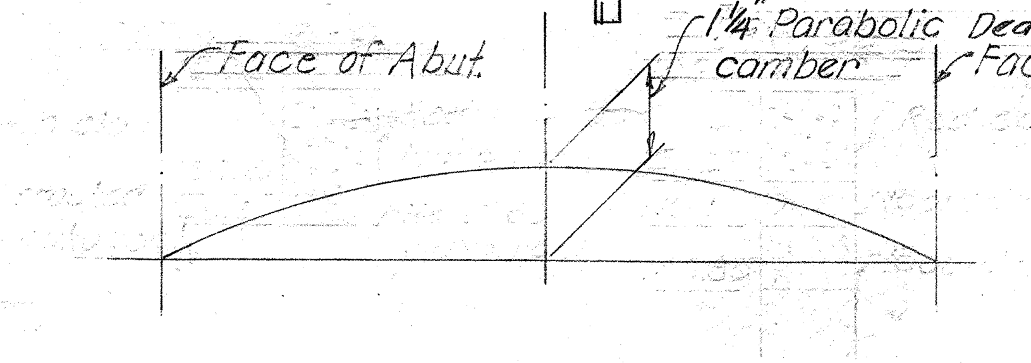
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	168	217


N
7 spaces @ 9'-0" o.c.
Drip Line
Ret. Wall #9-IA See Sht. #176
Ret. Wall See Sht. #177
#11-A
℄ 10th Ave. Az 208°31'30"
Detail D/B8
E/B7
1'-6"
1'-5"
1'-0"
El. 176.62
El. 177.57
Bott. Ftg. el. 145.50
Cont. Corbel See Sht. #169 for det.
Cont. Corbel See Sht. #169 for det.
D/B7
Approach Slab
66'-11"
Sta. 94+60.04
Sta. 95+20.04
El. 177.54
El. 178.42
61'-0"
Guard rail post. See typ. det. Sht. #169
℄ Sta. 94+00.04
10th Ave. Sta. 13+25
℄ Freeway
Az 208°31'30"
3'-0"
½" Expansion Joint
2 spc. @ 12'-6" = 25'-0"
2 spc. @ 12'-0" = 25'-0"
℄ Location 6x8 guard rail post
El. 177.54
El. 178.40
Bott. Ftg. el. 145.50
Cont. Corbel See Sht. #169 for det.
C/B7
D/B7
Approach Slab
66'-11"
Abutment #1
Abutment #2
61'-0"
El. 176.62
El. 177.57
Light Standard. See Highway Lighting Drawings.
Ret. Wall 00B7
Detail D/B8
Drip Line
A/B7
B/B7
7 spaces @ 9'-0" o.c.

LAYOUT PLAN

Scale: 1" = 10'-0"

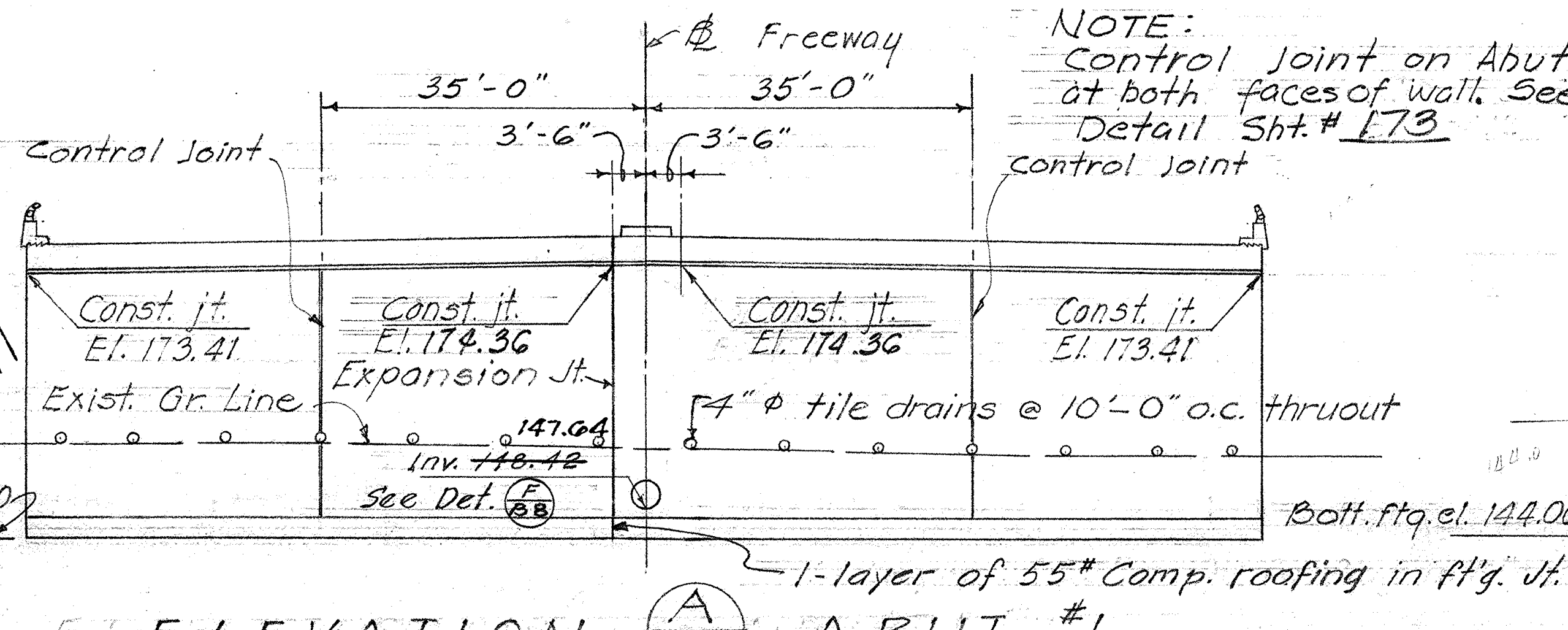

B-10
157.82
153.82
Firm red silty clay
Vesicular basaltic rock
133.82


Face of Abut.
1¼" Parabolic Dead load camber
Face of Abut.

CAMBER DIAGRAM

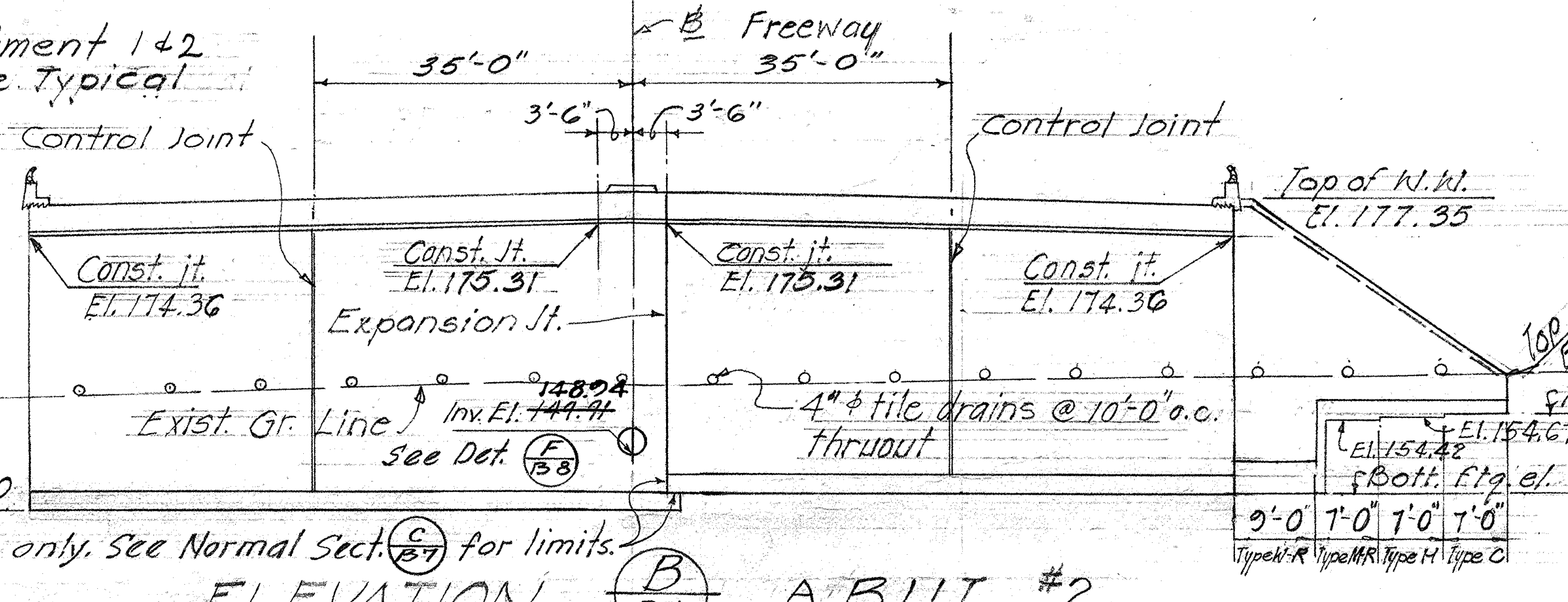
No Scale

NOTE:
Control Joint on Abutment 1 & 2 at both faces of wall. See Typical Detail Sht. #173


35'-0"
℄ Freeway
35'-0"
3'-6"
3'-6"
Control Joint
Control Joint
Const. jt. El. 173.41
Const. jt. El. 174.36
Expansion Jt.
Const. jt. El. 174.36
Const. jt. El. 173.41
Exist. Gr. Line
Inv. 147.04
See Det. F/B8
4" ø tile drains @ 10'-0" o.c. thruout
Bott. Ftg. el. 145.50
Bott. Ftg. el. 144.00
1-layer of 55# Comp. roofing in ftg. jt. only. See Normal Sect. C/B7 for limits.

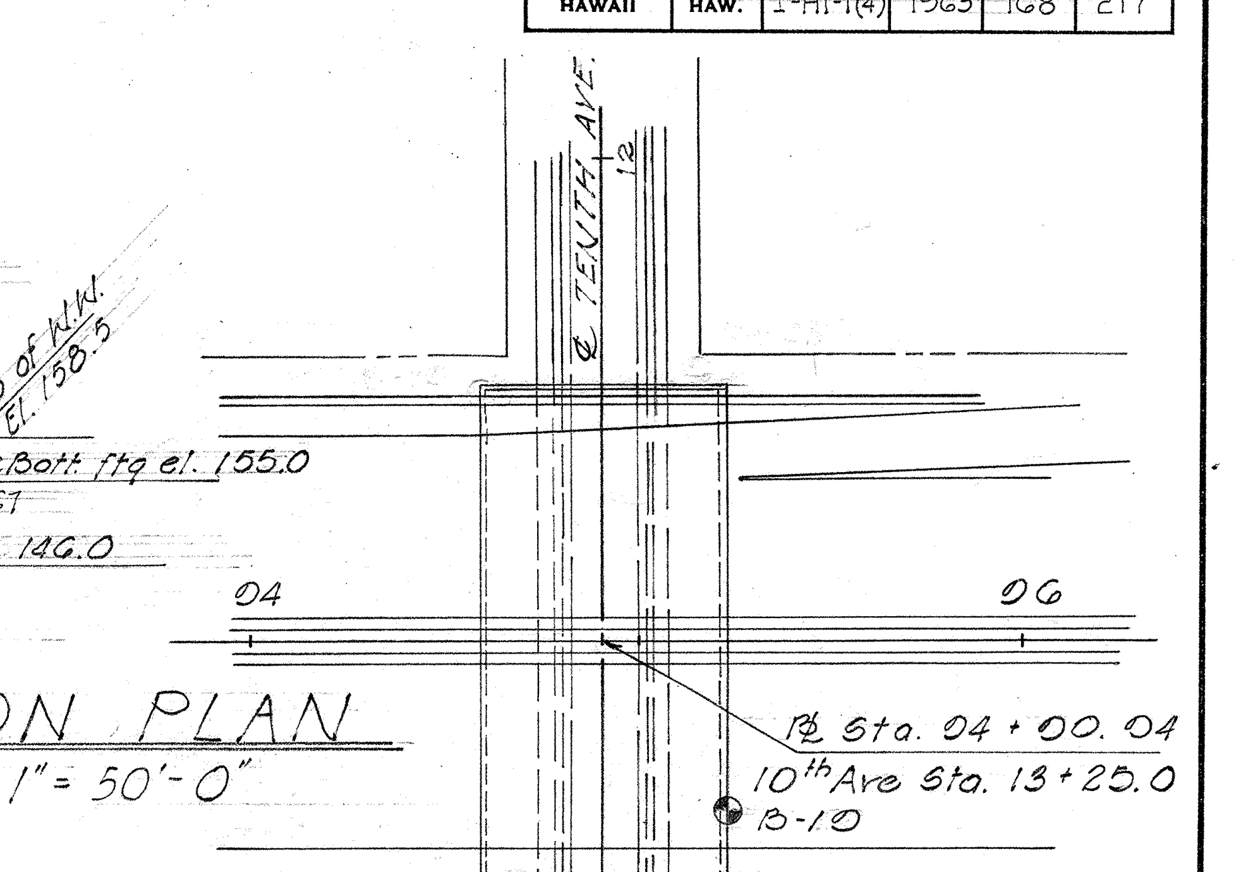
ELEVATION A/B7 ABUT. #1

Scale: 1" = 20'-0"


35'-0"
℄ Freeway
35'-0"
3'-6"
3'-6"
Control Joint
Control Joint
Top of W.W. El. 177.35
Top of W.W. El. 158.5
Const. jt. El. 174.36
Const. jt. El. 173.31
Expansion Jt.
Const. jt. El. 173.31
Const. jt. El. 174.36
Exist. Gr. Line
Inv. El. 148.04
See Det. F/B8
4" ø tile drains @ 10'-0" o.c. thruout
Bott. Ftg. el. 155.0
El. 154.82
El. 154.61
Bott. Ftg. el. 146.0
9'-0" 7'-0" 7'-0" 7'-6"

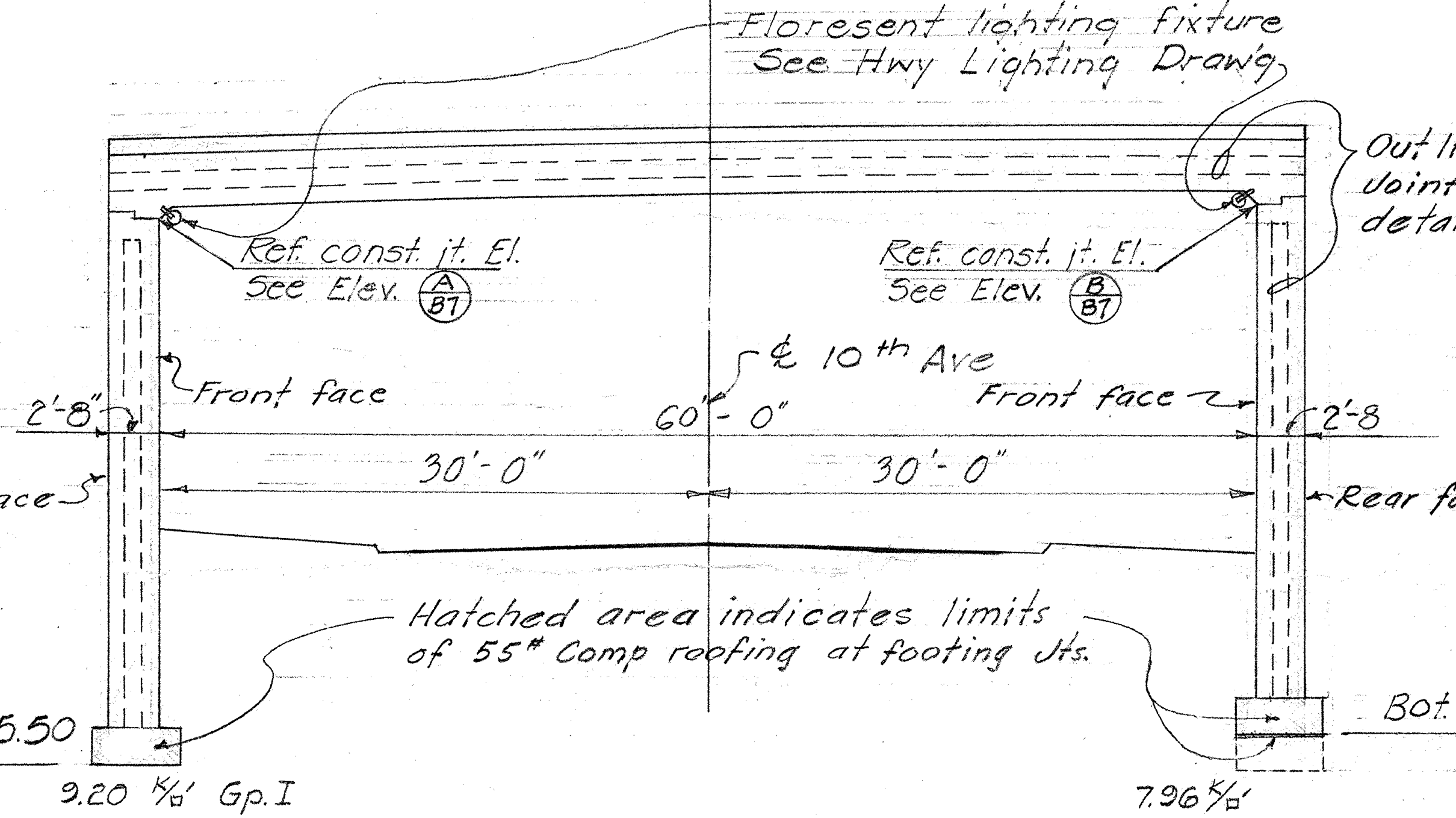
ELEVATION B/B7 ABUT. #2

Scale: 1" = 20'-0"


℄ TENTH AVE. 12
94
96
℄ Sta. 94+00.04
10th Ave. Sta. 13+25.0
B-10

LOCATION PLAN

Scale: 1" = 50'-0"


Floresent lighting fixture See Hwy Lighting Drawg.
Out line Exp. Joint Key. See detail.
Ref. const. jt. El. See Elev. A/B7
Ref. const. jt. El. See Elev. B/B7
℄ 10th Ave
2'-8"
Front face
60'-0"
Front face
2'-8"
30'-0"
30'-0"
Rear face
Rear face
Hatched area indicates limits of 55# Comp roofing at footing jts.
Bot. Ftg.
9.20 %' Gp. I
7.96 %' Gp. I

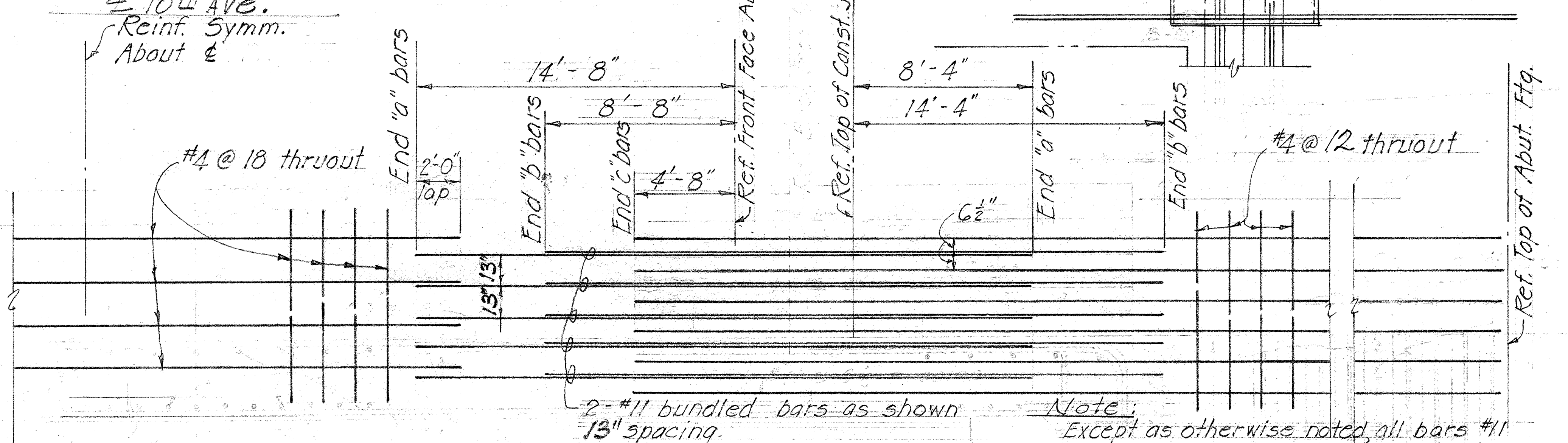
NORMAL SECTION C/B7

Scale: 1" = 10'-0"

* ESTIMATED QUANTITIES

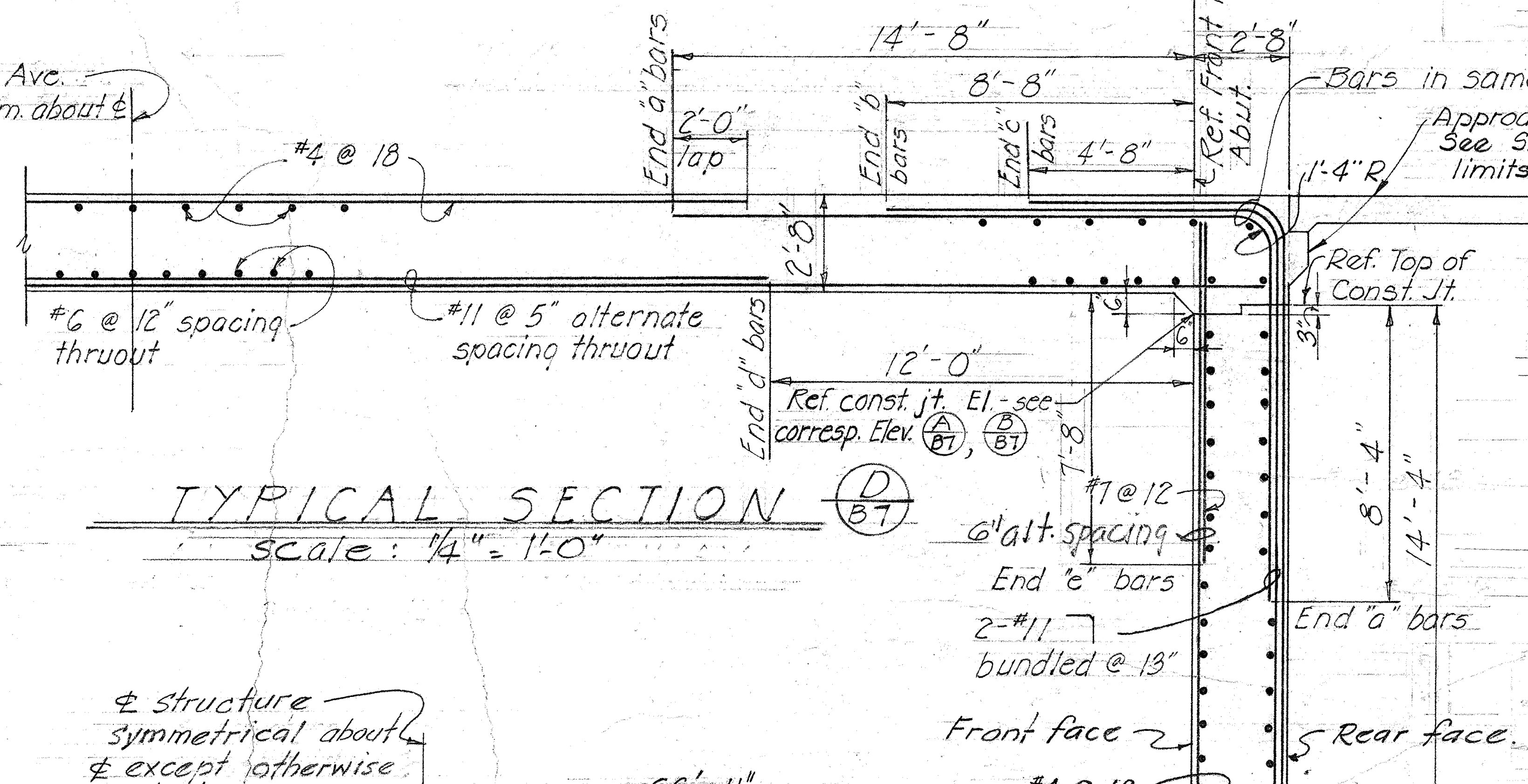
Class A-1 Concrete	Lump Sum	(1,749	c.y.)
Reinforcing Steel	Lump Sum	(256,962	lbs.)
Structural Excavation		862	c.y.
Filter Material		209	c.y.
Concrete Railing		133	lin. ft.
Metal Bridge Railing		128	lin. ft.

* Estimated quantities doesnot include approach slabs to bridge, but are included in the appropriate highway items.


℄ 10th Ave. Reinf. Symm. About ℄
14'-8"
8'-8"
4'-8"
8'-4"
14'-4"
6½"
End "a" bars
End "b" bars
End "c" bars
Ref. Front Face Abut.
Ref. Top of Const. Jt.
End "a" bars
End "b" bars
Ref. Top of Abut. Ftg.
2'-0" lap
#4 @ 18 thruout
#4 @ 12 thruout
13" 13"
2-#11 bundled bars as shown 13" spacing.
Note: Except as otherwise noted all bars #11

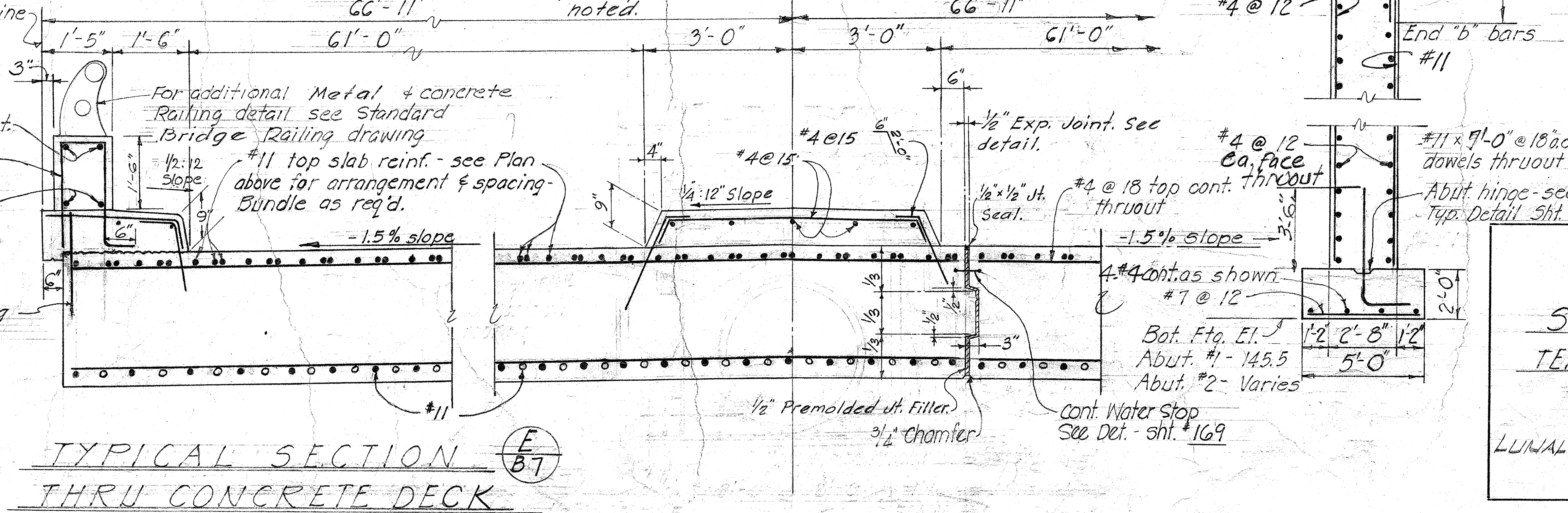
PLAN - TYPICAL ARRANGEMENTS OF TOP LAYER DECK REINFORCEMENTS

No Scale


℄ 10th Ave. Reinf. symm. about ℄
14'-8"
8'-8"
4'-8"
2'-8"
2'-0" lap
End "a" bars
End "b" bars
End "c" bars
Ref. Front Face Abut.
Bars in same plane
Approach Slab & Corbel See Sht. #169 for limits and details
1'-4" R
#4 @ 18
#6 @ 12" spacing thruout
#11 @ 5" alternate spacing thruout
2'-0"
12'-0"
End "d" bars
Ref. const. jt. El. - see corresp. Elev. A/B7 B/B7
Ref. Top of Const. Jt.
3½"
7'-8"
#7 @ 12
6" alt. spacing
End "c" bars
2-#11 bundled @ 13"
8'-4"
14'-4"
End "a" bars

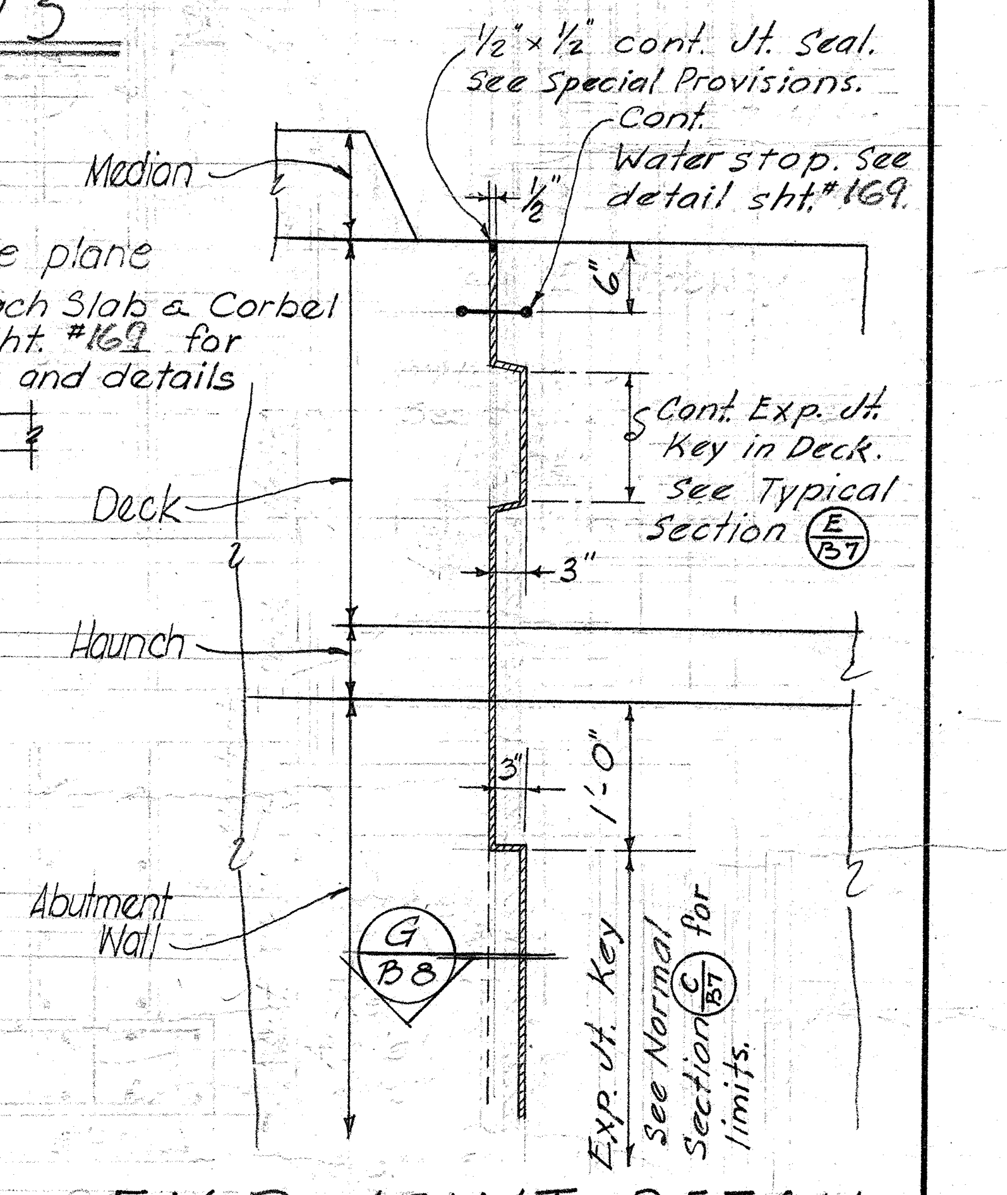
TYPICAL SECTION D/B7

Scale: ¼" = 1'-0"


℄ Structure symmetrical about ℄ except otherwise noted.
Drip Line
66'-11"
66'-11"
1'-5"
1'-6"
61'-0"
3'-0"
3'-0"
61'-0"
3"
2-#5 Cont.
#4 @ 15
2-#4 cont.
For additional Metal & concrete Railing detail see Standard Bridge Railing drawing
1½:12 Slope
#11 top slab reinf. - see Plan above for arrangement & spacing - Bundle as req'd.
-1.5% slope
4"
9"
¼:12" Slope
#4 @ 15
6"
½" Exp. Joint. See detail.
½"x½" Jt. Seal.
#4 @ 18 top cont. thruout
-1.5% slope
#4 x 2'-0" long @ 15" dowels.
#11
½" Premolded Jt. Filler
¾" Chamfer
Cont. Water Stop See Det. - sht. #169
3"
Front face
#4 @ 12
Rear face
End "b" bars
#11
#4 @ 12 ea. face thruout
#11 x 7'-0" @ 18" o.c. dowels thruout
Abut. hinge - see Typ. Detail Sht. #173
3'-6"
4-#4 cont. as shown
#7 @ 12
Bot. Ftg. El. Abut. #1 - 145.5 Abut. #2 - Varies
1'-2" 2'-8" 1'-2"
5'-0"
2'-0"

TYPICAL SECTION E/B7 THRU CONCRETE DECK

Scale: ½" = 1'-0"


½" x ½" cont. Jt. Seal. See Special Provisions.
Cont. Water stop. See detail sht. #169.
Median
½"
6"
Cont. Exp. Jt. Key in Deck. See Typical Section E/B7
Deck
3"
Haunch
3"
1'-0"
Abutment Wall
G/B8
Exp. Jt. Key See Normal Section C/B7 for limits.

EXP. JOINT DETAIL

Scale: ¾" = 1'-0"

Reference Notes

Top of concrete deck to follow ℄ roadway profile grade.

For Typical Det. & General Notes see Sht. #173

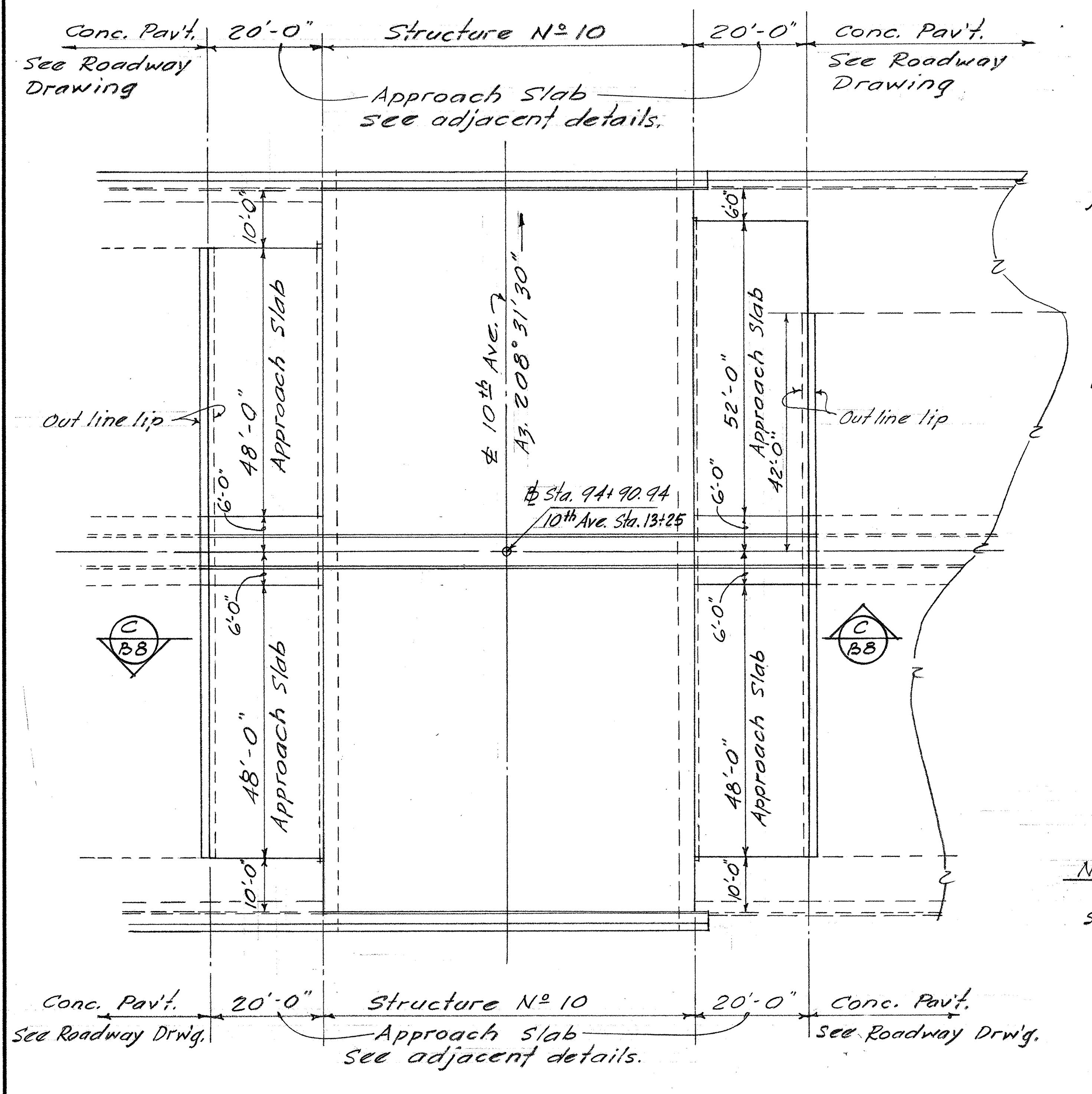
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE № 10
TENTH AVE. SEPARATION
BASE LINE STA. 94+90.94
LUNALILO FREEWAY Proj. No. I-H1-1(4):24
SEPT. 1962

SHEET No. B7 OF SHEETS

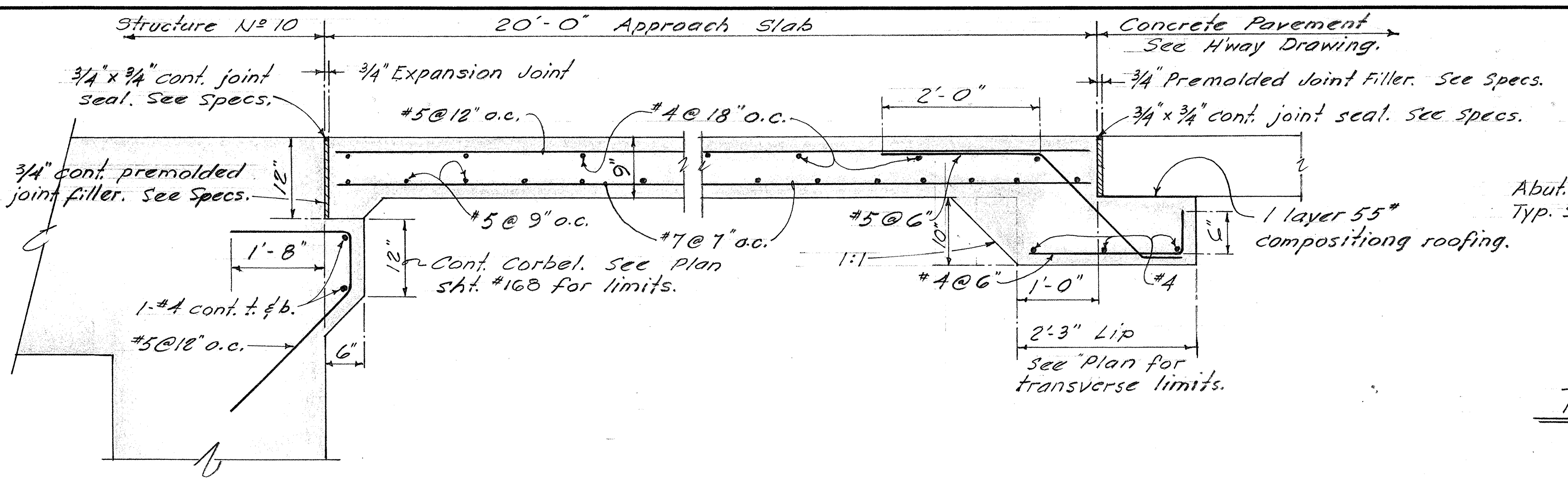
ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY DATE
DRAWN BY S.Y. "
TRACED BY "
DESIGNED BY C.R.Y. "
QUANTITIES BY N.Y. T.S. "
CHECKED BY P. Yamashita J.T.O. "

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	169	217

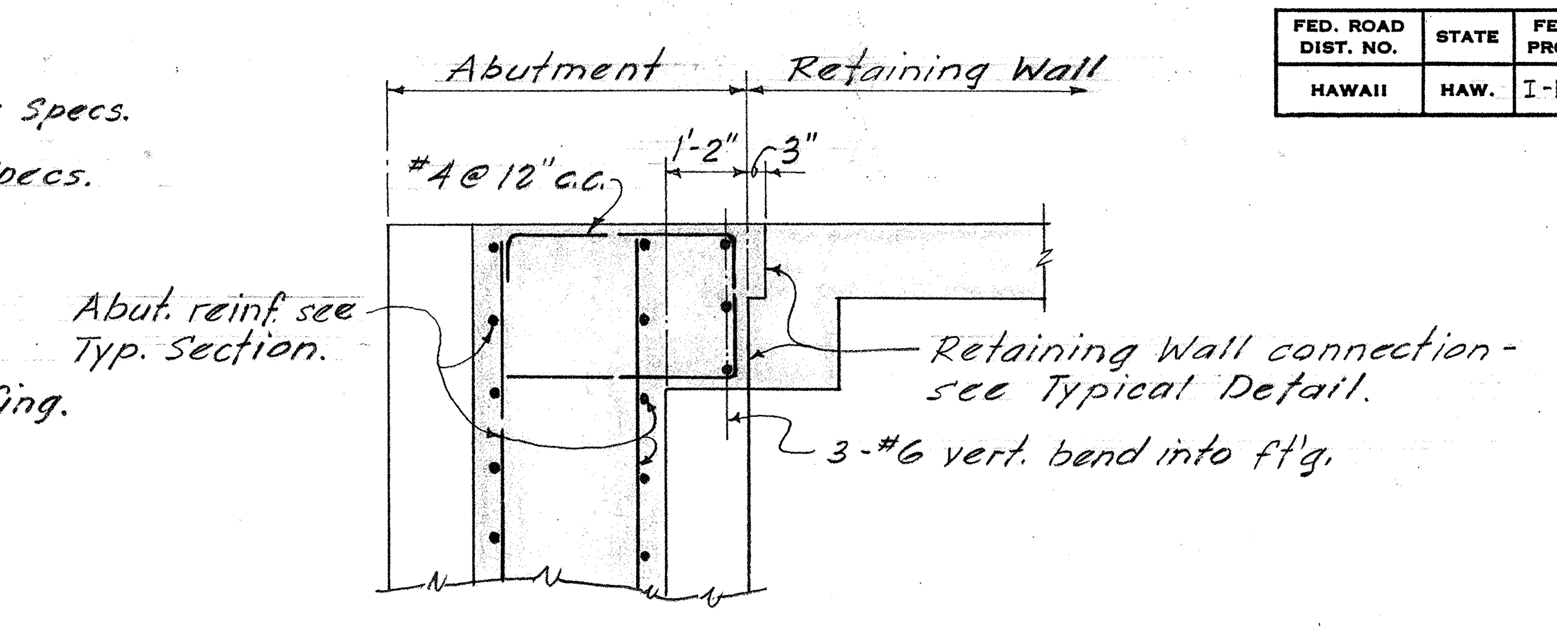

Conc. Pav't.
See Roadway Drawing
20'-0"
Structure No 10
20'-0"
Conc. Pav't.
See Roadway Drawing
Approach Slab see adjacent details.
Out line lip
10'-0"
48'-0"
Approach Slab
6'-0"
℄ 10th Ave.
Az. 208° 31' 30"
℄ Sta. 94+90.94
10th Ave. Sta. 13+25
52'-0"
42'-0"
Approach Slab
C
B8
Conc. Pav't.
See Roadway Drwg.
20'-0"
Structure No 10
20'-0"
Conc. Pav't.
See Roadway Drw'g.
Approach Slab
See adjacent details.

PLAN

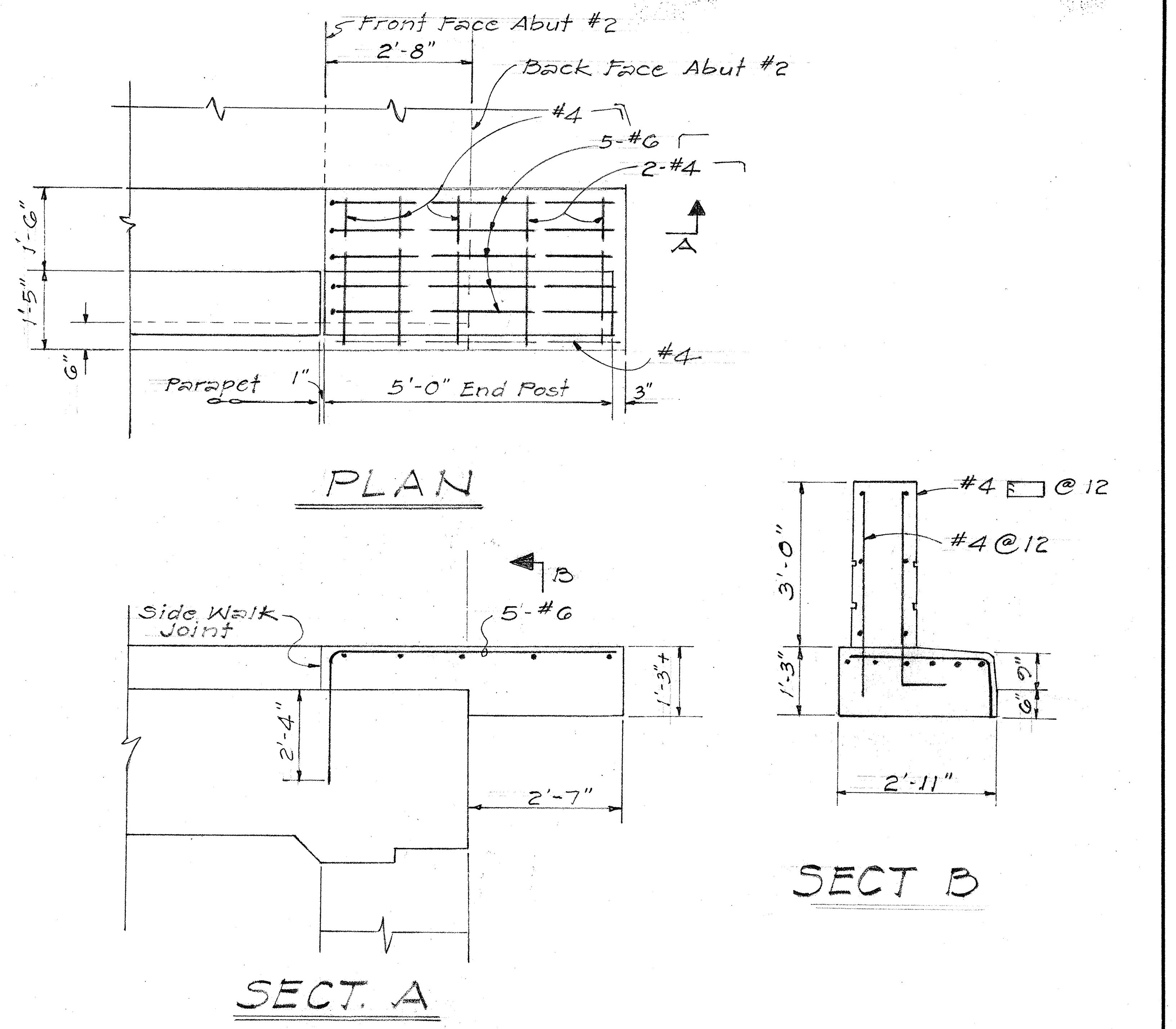
Scale: 1"=20'


Structure No 10
20'-0" Approach Slab
Concrete Pavement
See Hway Drawing.
3/4"x3/4" cont. joint seal. See Specs.
3/4" Expansion Joint
3/4" Premolded Joint Filler. See Specs.
3/4"x3/4" cont. joint seal. See Specs.
#5@12" o.c.
#4@18" o.c.
2'-0"
3/4" cont. premolded joint filler. See Specs.
12"
9"
#5@9" o.c.
#7@7" o.c.
#5@6"
1 layer 55" compositiong roofing.
1'-8"
12"
Cont. Corbel. See Plan sht. #168 for limits.
1:1
10"
1'-0"
#4@6"
#4
1-#4 cont. t. & b.
#5@18" o.c.
6"
2'-3" Lip
See Plan for transverse limits.

SECTION (C/B8)


Abutment
Retaining Wall
#4@12" o.c.
1'-2"
3"
Abut. reinf. see Typ. Section.
Retaining Wall connection - see Typical Detail.
3-#6 vert. bend into ft'g.

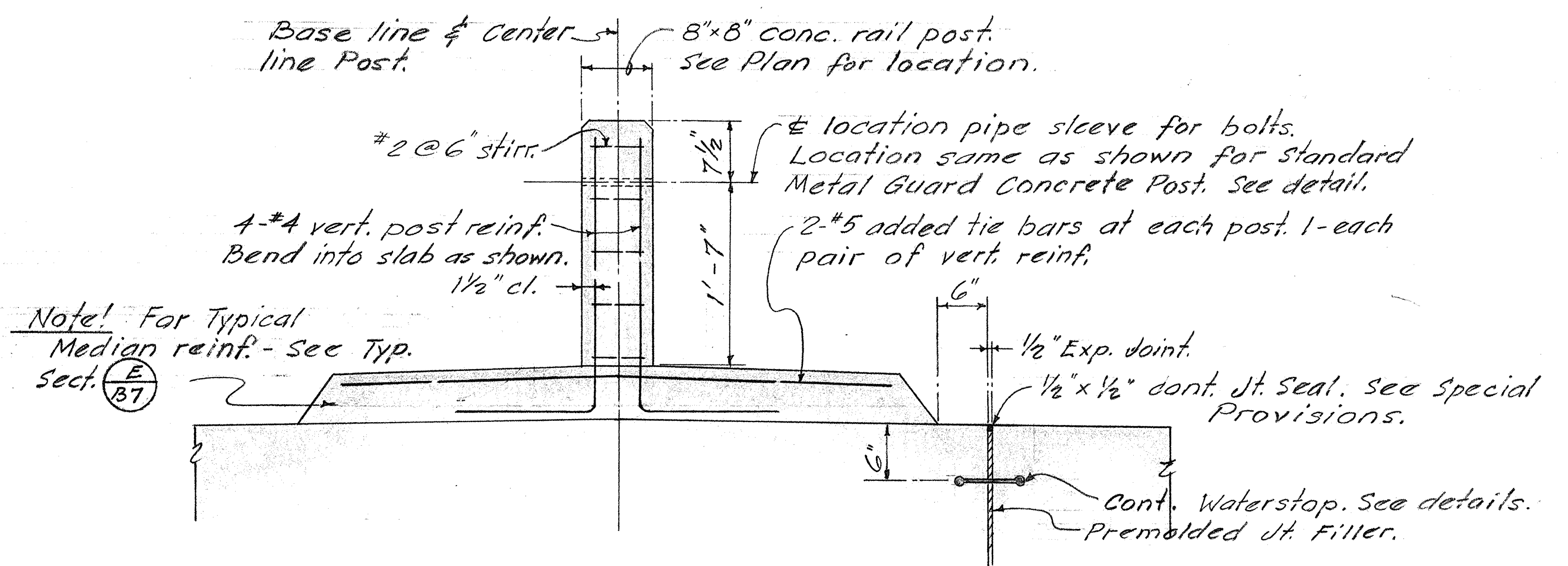
TYPICAL DETAIL (D/B8)


Front Face Abut #2
2'-8"
Back Face Abut #2
#4
5-#6
2-#4
A
1'-6"
1'-5"
6"
#4
Parapet
1"
5'-0" End Post
3"
PLAN
B
Side Walk Joint
5-#6
2'-4"
1'-3"
2'-7"
SECT. A
#4 @12
#4@12
3'-0"
1'-3"
6"
2'-11"
SECT B

END POST DETAIL FOR SO.-EA. CORNER OF STRUCTURE No. 10

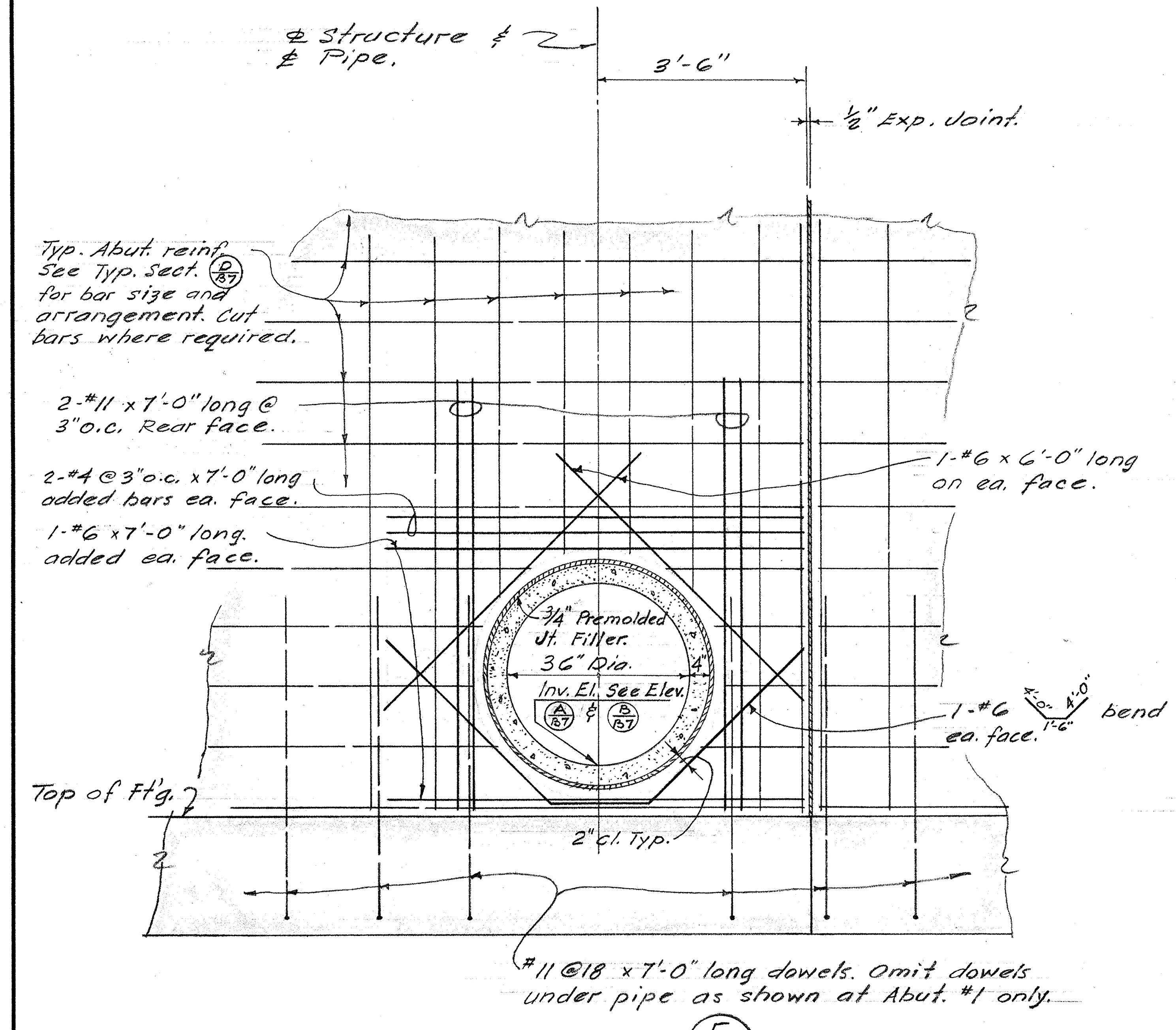
Scale: 1/2" = 1'-0"

AS BUILT


Base line & Center line Post.
8"x8" conc. rail post. See Plan for location.
#2 @ 6" stirr.
7 1/2"
℄ location pipe sleeve for bolts. Location same as shown for Standard Metal Guard Concrete Post. See detail.
4-#4 vert. post reinf. Bend into slab as shown. 1 1/2" cl.
1'-7"
2-#5 added tie bars at each post. 1-each pair of vert. reinf.
Note! For Typical Median reinf. - See Typ. Sect. E/B7
6"
1/2" Exp. Joint
1/2"x1/2" cont. Jt. Seal. See Special Provisions.
6"
Cont. Waterstop. See details.
Premolded Jt. Filler.

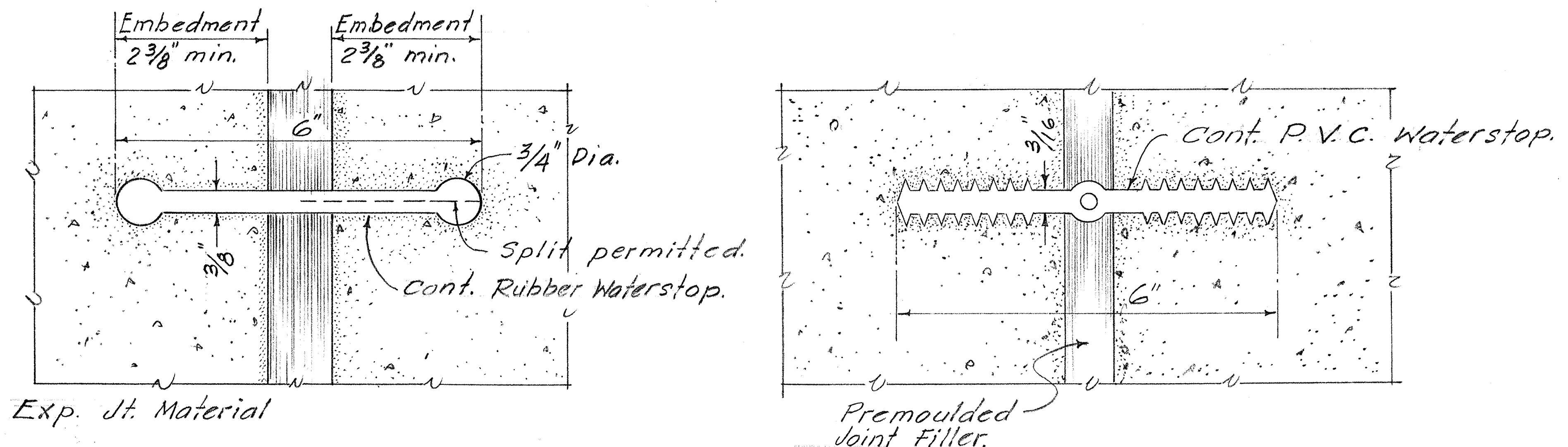
TYPICAL GUARD RAIL POST AT BRIDGE MEDIAN

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


℄ Structure & ℄ Pipe.
3'-6"
1/2" Exp. Joint
Typ. Abut. reinf. See Typ. Sect. D/B8 for bar size and arrangement. Cut bars where required.
2-#11 x 7'-0" long @ 3" o.c. Rear Face.
2-#4 @ 3" o.c. x 7'-0" long added bars ea. face.
1-#6 x 7'-0" long. added ea. face.
1-#6 x 6'-0" long on ea. face.
3/4" Premolded Jt. Filler.
36" Dia.
Inv. El. See Elev. B/B7 & D/B7
1-#6 ea. face.
1'-0"
1'-6"
bend bar on
Top of Ft'g.
2" cl. Typ.
#11 @ 18 x 7'-0" long dowels. Omit dowels under pipe as shown at Abut. #1 only.

DETAIL (F/B8)
ABUT. PIPE OPEN'G REINF. DETAIL

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


Embedment
2 3/8" min.
Embedment
2 3/8" min.
6"
3/4" Dia.
3/8
Split permitted.
Cont. Rubber Waterstop.
Exp. Jt. Material
3/16
Cont. P.V.C. Waterstop.
6"
Premoulded Joint Filler.

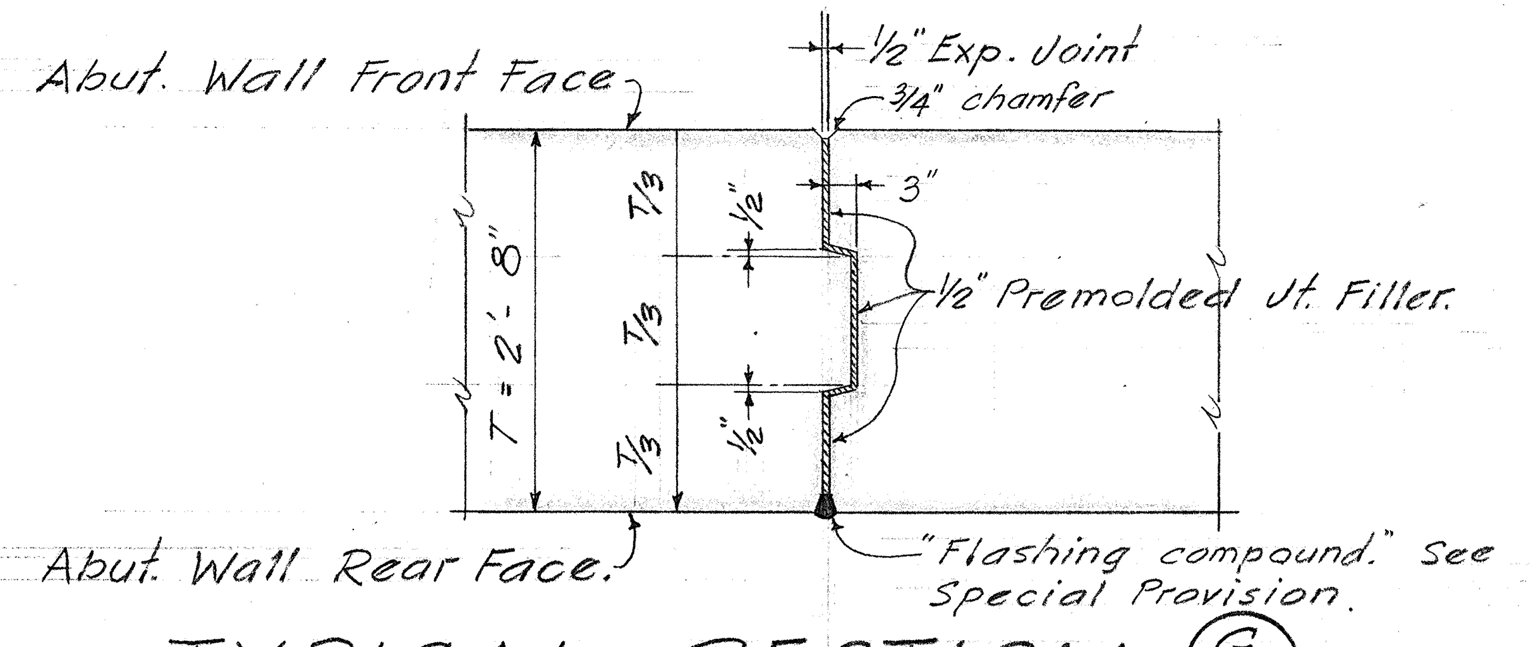
TYPE I

TYPE II

NOTE: For additional Waterstop information see Special Provisions.

WATERSTOP DETAILS

Half Size


Abut. Wall Front Face
1/2" Exp. Joint
3/4" chamfer
3"
T/3
T/3
T/3
T = 2'-8"
1/2"
1/2"
1/2" Premolded Jt. Filler.
Abut. Wall Rear Face.
"Flashing compound." See Special Provision.

TYPICAL SECTION (G/B8)

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE No 10
TENTH AVE. SEPARATION
BASE LINE STA. 94+90.94

Lunalilo Freeway Proj. #I-HI-1(4):24
April 1963

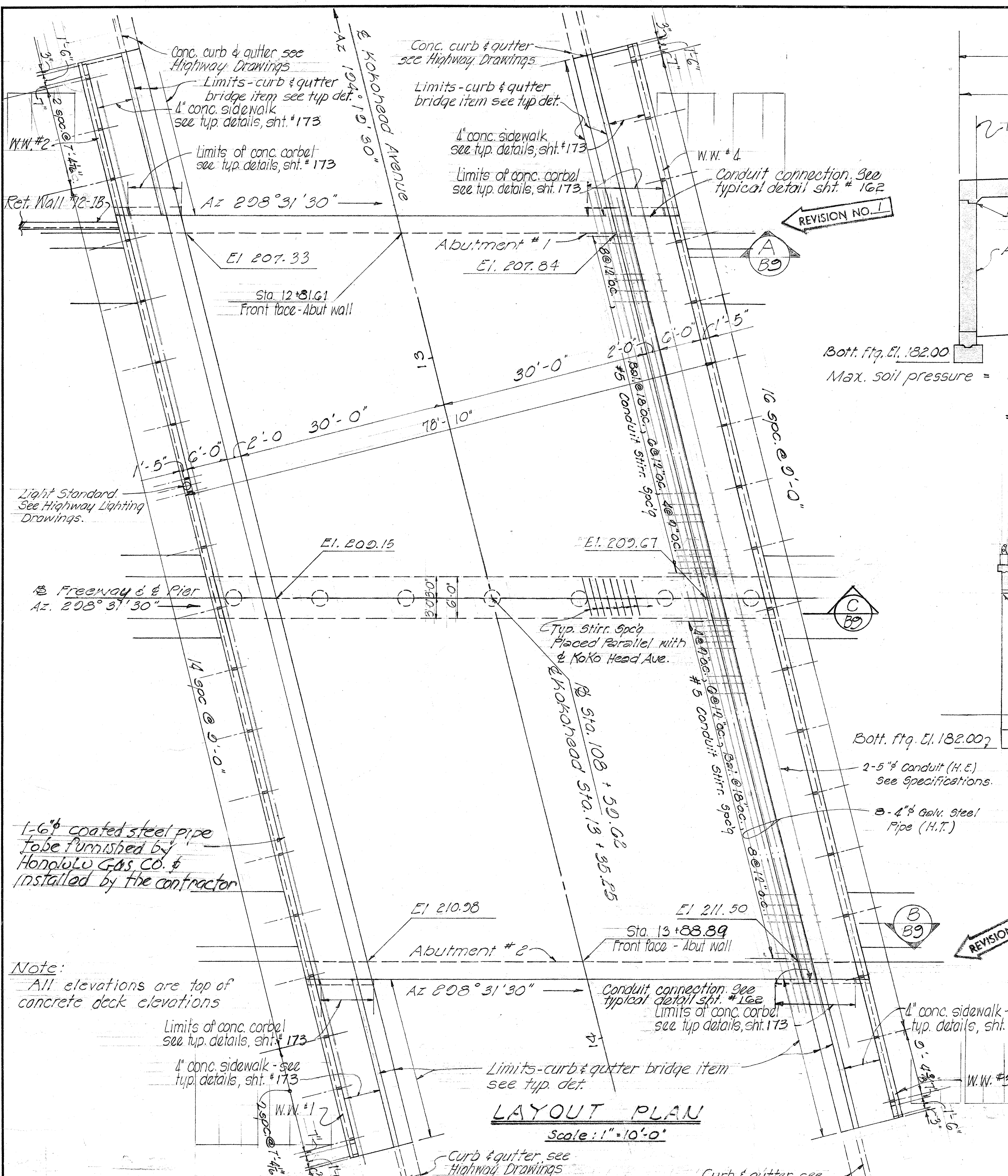
SHEET No. B8 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY Shimamura	
No.	TRACED BY	
	DESIGNED BY H.K. R.K.Y.	
	QUANTITIES BY J.S. R.T.Y.	
	CHECKED BY J.T.O. R.T.Y.	

ED ON CLEARPRINT 1000-H

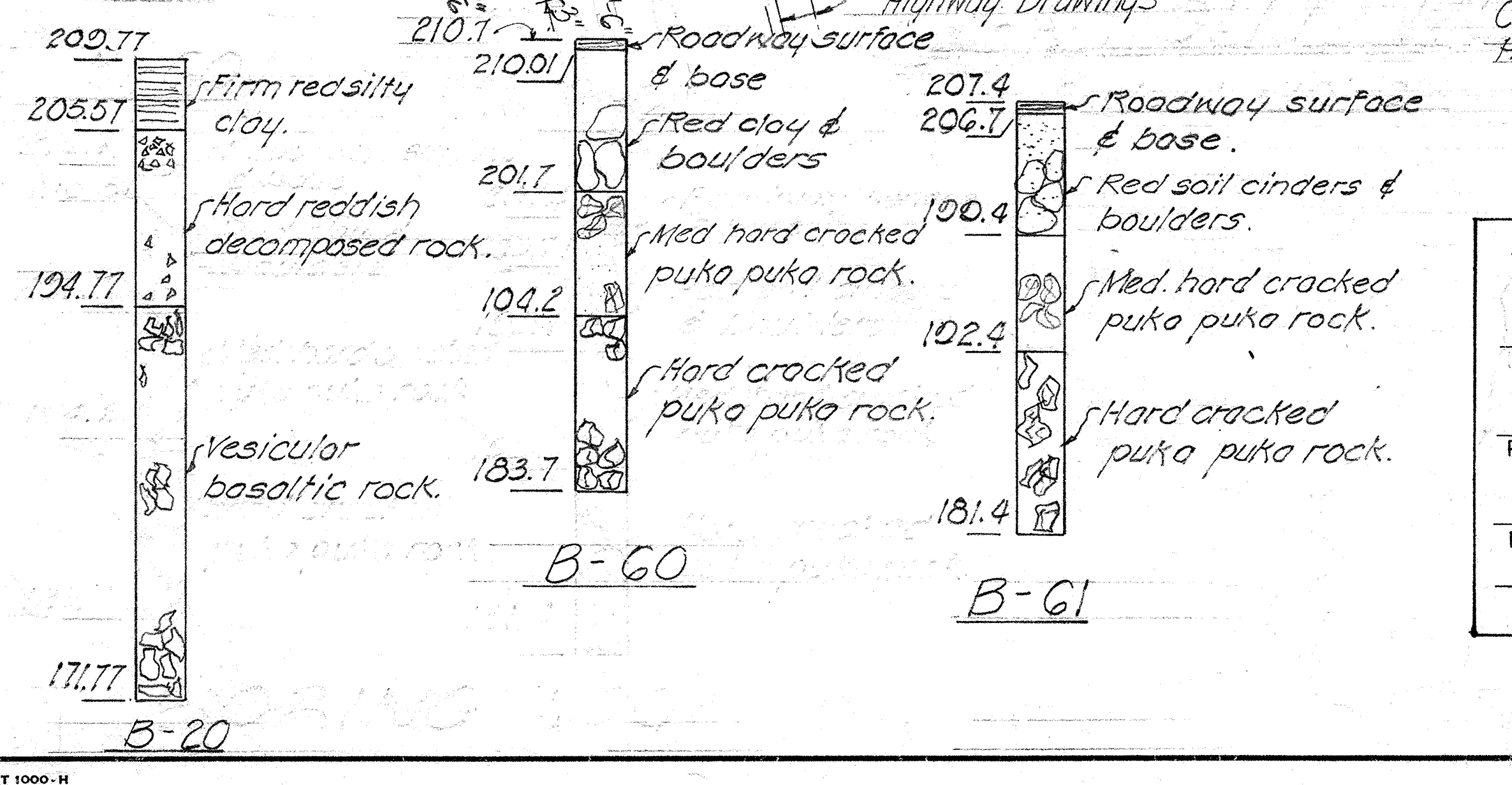
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	170	217

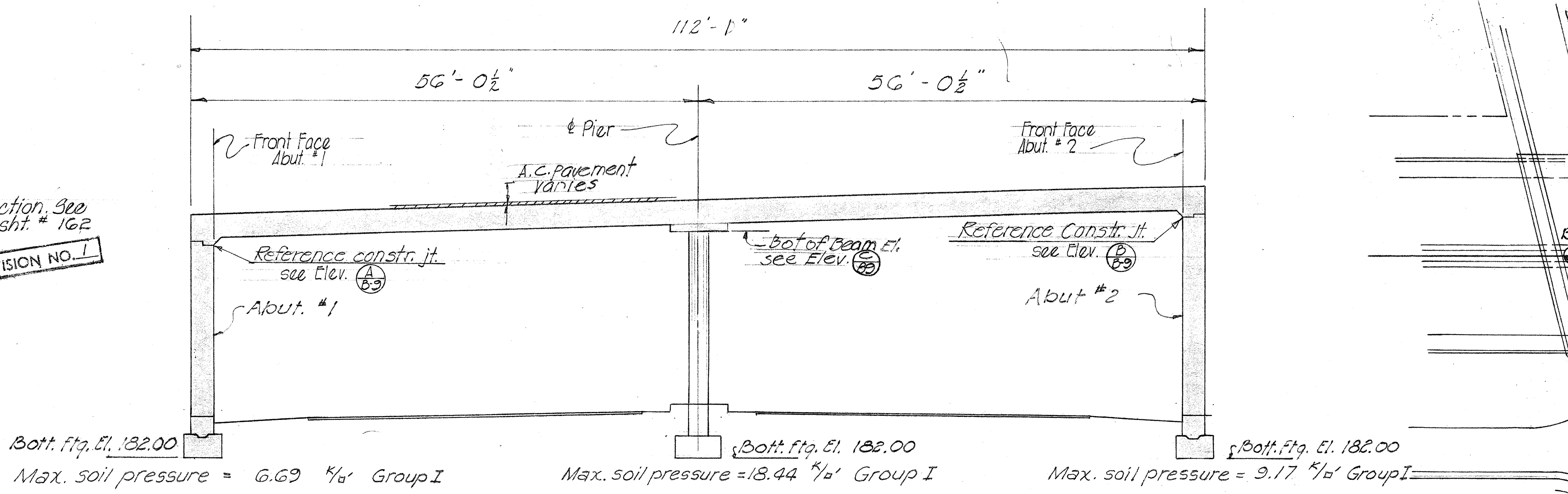
Revision #1 12/27/63
Eliminated Ret. Wall #13 I.B. & 13 O.B.
Revised : 12/13/63
12-4" Galv. Steel Pipe (H.T.) to 8-4" Pipe


Conc. curb & gutter see Highway Drawings
Limits-curb & gutter bridge item see typ det.
4" conc. sidewalk see typ. details, sht. #173
Limits of conc. corbel see typ. details, sht. #173
Conc. curb & gutter see Highway Drawings.
Limits-curb & gutter bridge item see typ det.
4" conc. sidewalk see typ. details, sht. #173
Limits of conc. corbel see typ. details, sht. 173
Conduit connection. See typical detail sht. # 162
W.W. #2
W.W. #4
Ret. Wall 12-18
Az 208° 31' 30"
Az 194° 1' 30"
Kokohead Avenue
REVISION NO. 1
Abutment #1
El 207.33
El. 207.84
Sta. 12 + 81.61
Front face-Abut wall
30'-0"
78'-10"
2'-0
6'-0
1'-5"
Light Standard See Highway Lighting Drawings.
El. 209.15
El. 209.67
℄ Freeway & ℄ Pier
Az. 208° 31' 30"
Typ. Stirr. Spc'g Placed Parallel with ℄ Koko Head Ave.
℄ Sta. 108 + 59.62
℄ Kokohead Sta. 13 + 35.25
#5 Conduit Stirr. Spc'g
14 spc @ 9'-0"
16 spc @ 9'-0"
2-5"⌀ Conduit (H.E.) See Specifications.
8-4"⌀ Galv. Steel Pipe (H.T.)
1-6"⌀ coated steel pipe to be furnished by Honolulu Gas Co. & installed by the contractor
El 210.38
El 211.50
Sta. 13 + 88.89
Front face - Abut wall
Abutment #2
Az 208° 31' 30"
Conduit connection. See typical detail sht. #162
Limits of conc. corbel see typ details, sht. 173
4" conc. sidewalk - see typ. details, sht. 173
Limits of conc. corbel see typ. details, sht. 173
4" conc. sidewalk - see typ. details, sht. #173
Limits-curb & gutter bridge item see typ. det.
W.W. #1
W.W. #3
Curb & gutter see Highway Drawings
Curb & gutter see Highway Drawings

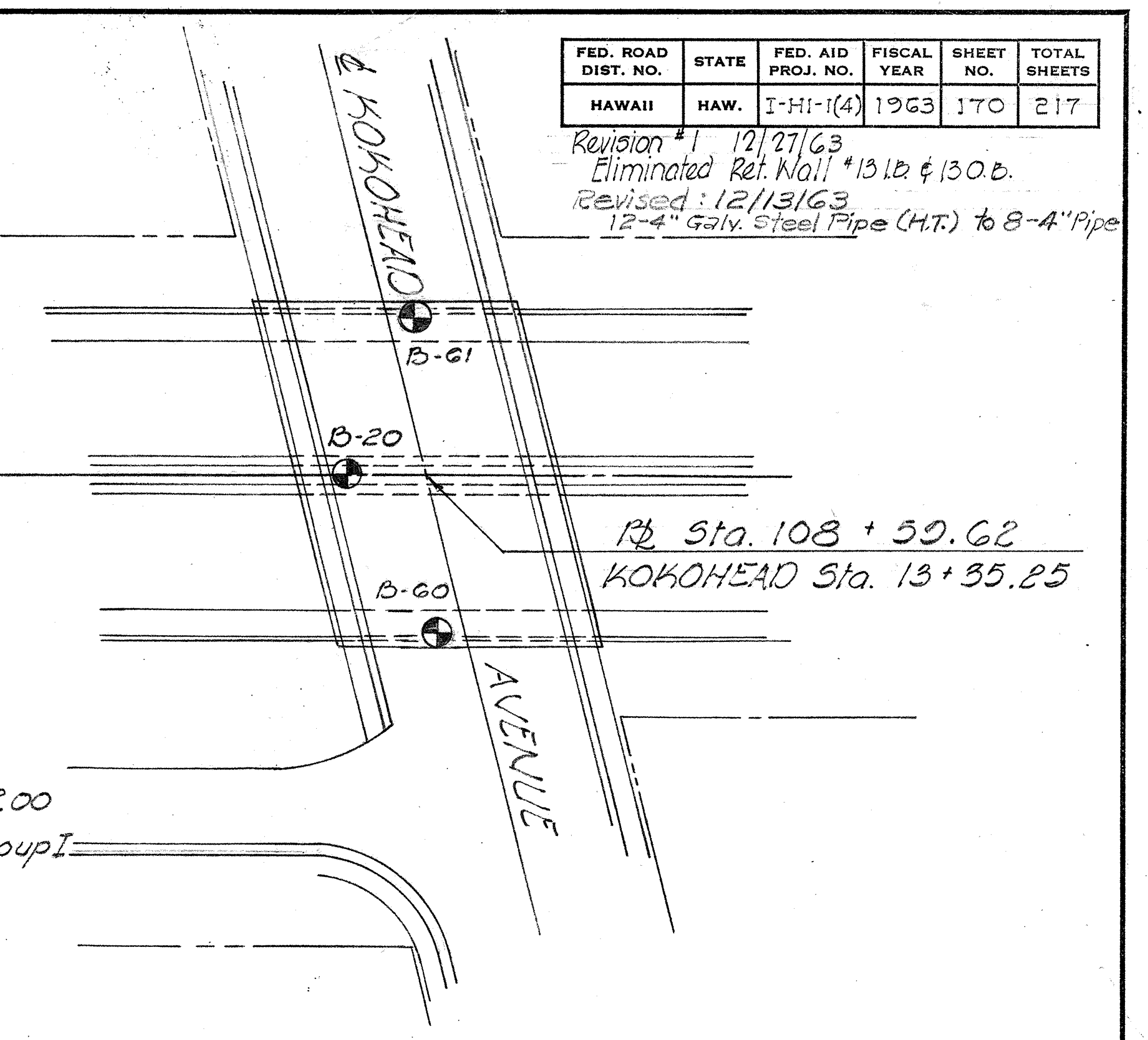
Note:
All elevations are top of concrete deck elevations

LAYOUT PLAN
Scale : 1" = 10'-0"

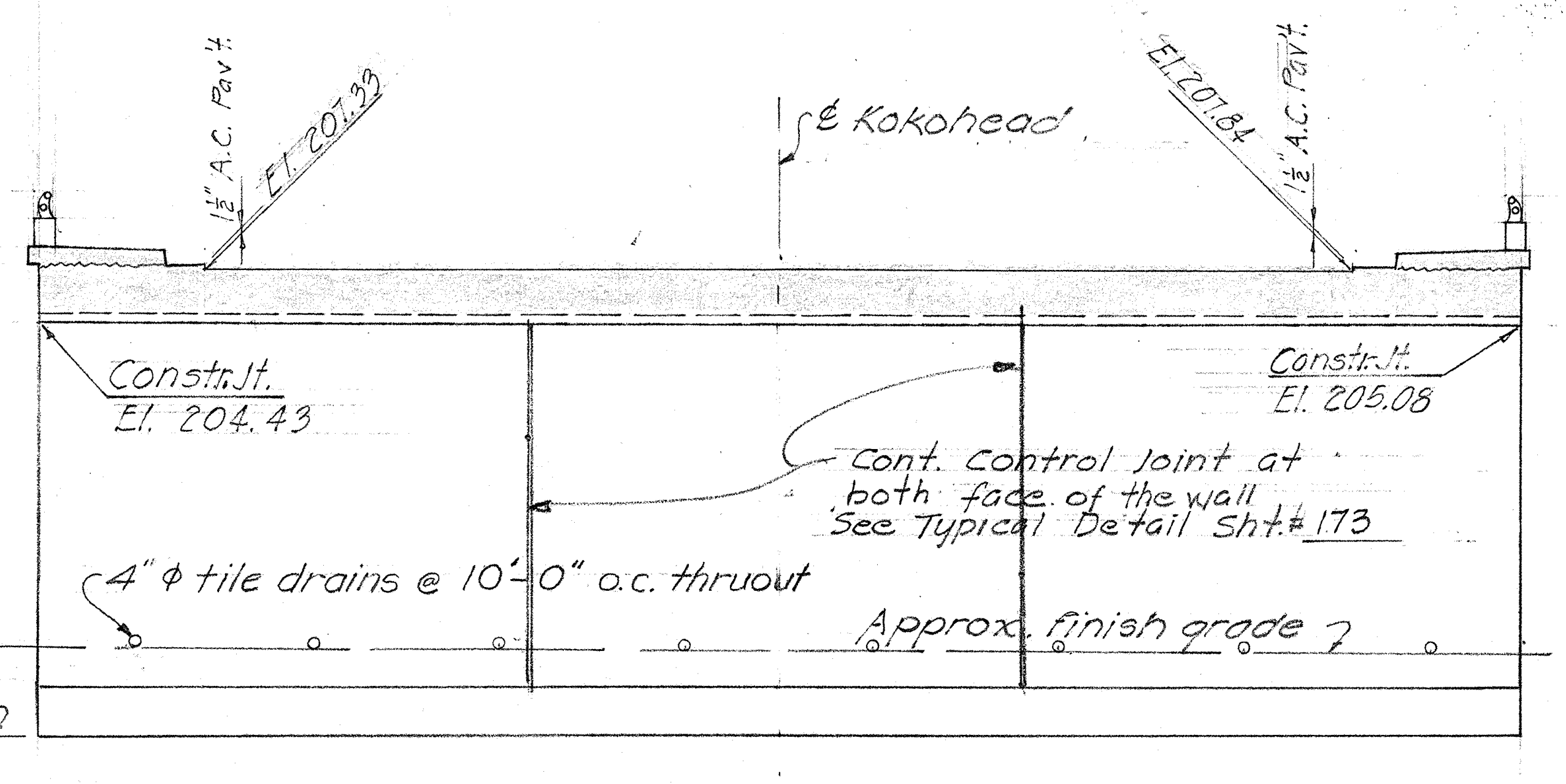

209.77
205.57
Firm redsilty clay.
Hard reddish decomposed rock.
194.77
Vesicular basaltic rock.
171.77
B-20
210.01
Roadway surface & base
Red clay & boulders
201.7
Med. hard cracked puka puka rock.
194.2
Hard cracked puka puka rock.
183.7
B-60
207.4
206.7
Roadway surface & base.
Red soil cinders & boulders.
199.4
Med. hard cracked puka puka rock.
192.4
Hard cracked puka puka rock.
181.4
B-61


112'-1"
56'-0½"
56'-0½"
℄ Pier
Front Face Abut. #1
Front Face Abut. #2
A.C. Pavement Varies
Reference constr. jt. see Elev. A/B9
Bot. of Beam El. see Elev. C/B9
Reference Constr. Jt. see Elev. B/B9
Abut. #1
Abut #2
Bott. Ftg. El. 182.00
Bott. Ftg. El. 182.00
Bott. Ftg. El. 182.00
Max. soil pressure = 6.69 K/□' Group I
Max. soil pressure = 18.44 K/□' Group I
Max. soil pressure = 9.17 K/□' Group I

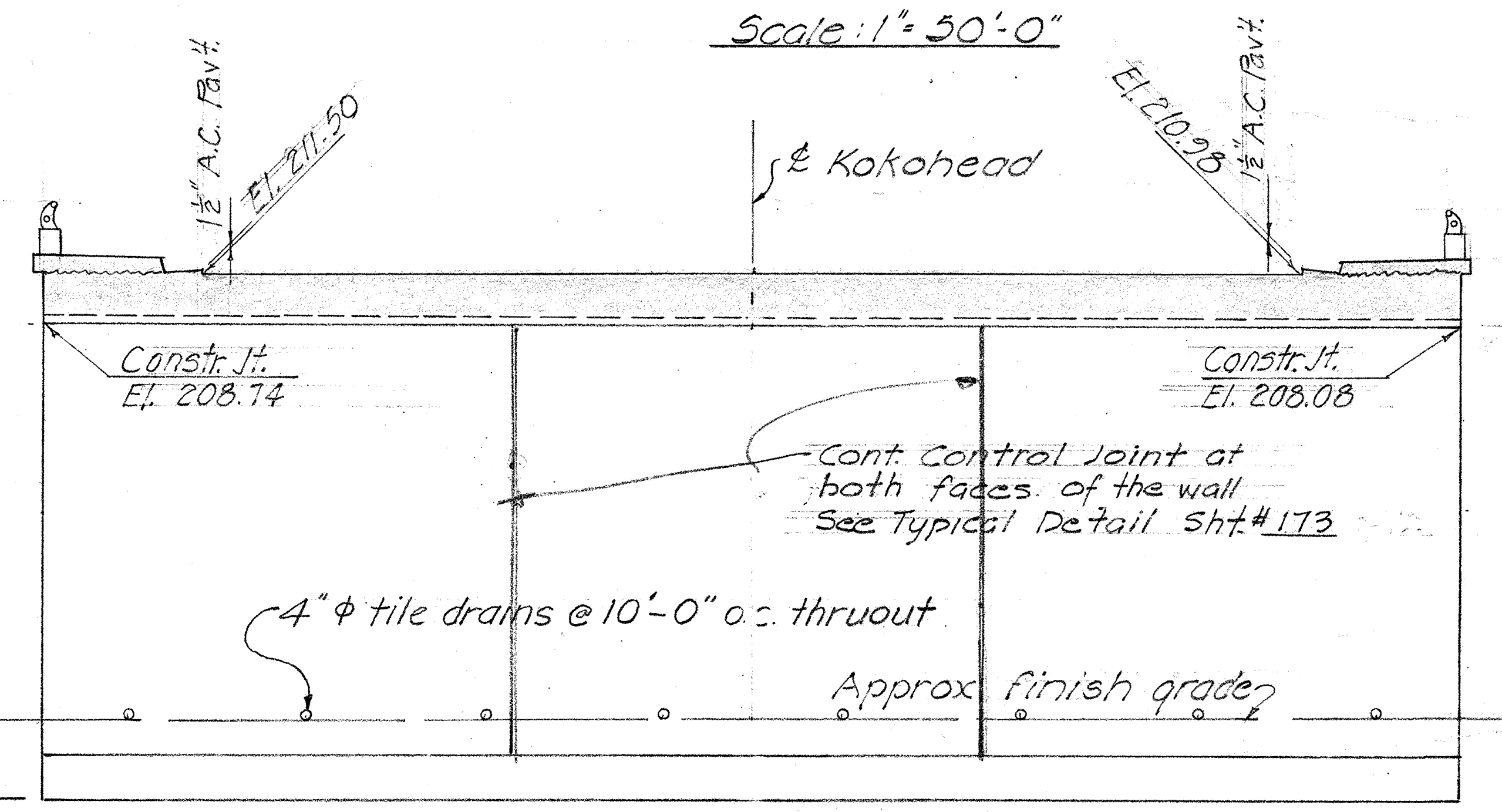
LONGITUDINAL SECTION @ ℄ KOKOHEAD AVE.
Scale : 1" = 10'-0"


℄ KOKOHEAD
B-61
B-20
B-60
℄ Sta. 108 + 59.62
KOKOHEAD Sta. 13 + 35.25
AVENUE

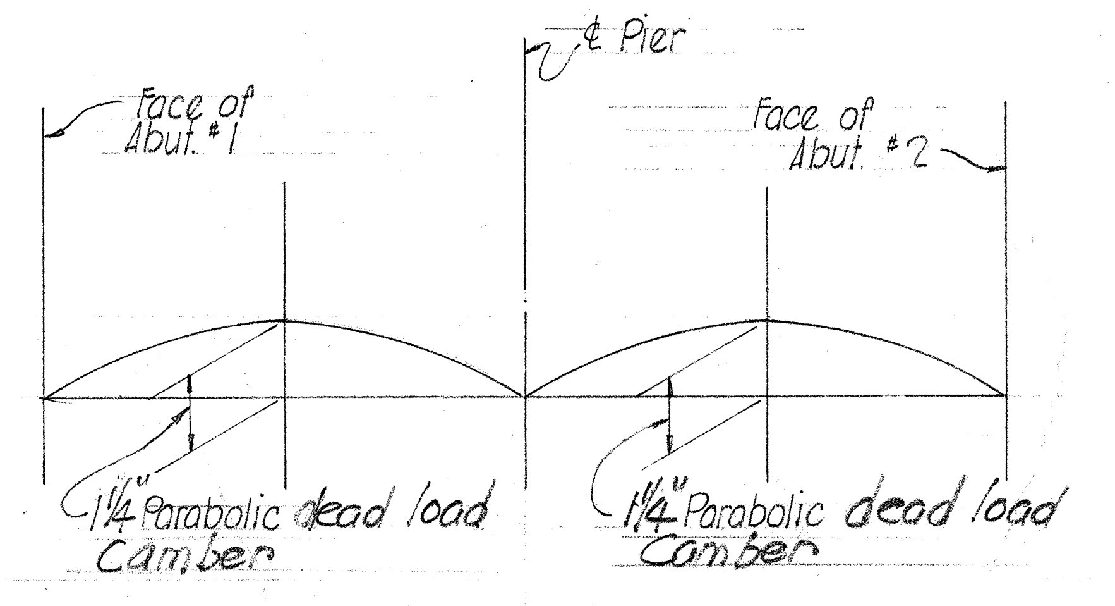
LOCATION PLAN
Scale : 1" = 50'-0"


1½" A.C. Pav't.
El. 207.33
El. 207.84
1½" A.C. Pav't.
℄ Kokohead
Constr. Jt. El. 204.43
Constr. Jt. El. 205.08
Cont. control joint at both face of the wall See Typical Detail Sht. # 173
4"⌀ tile drains @ 10'-0" o.c. thruout
Approx. finish grade
Bott. Ftg. El. 182.00

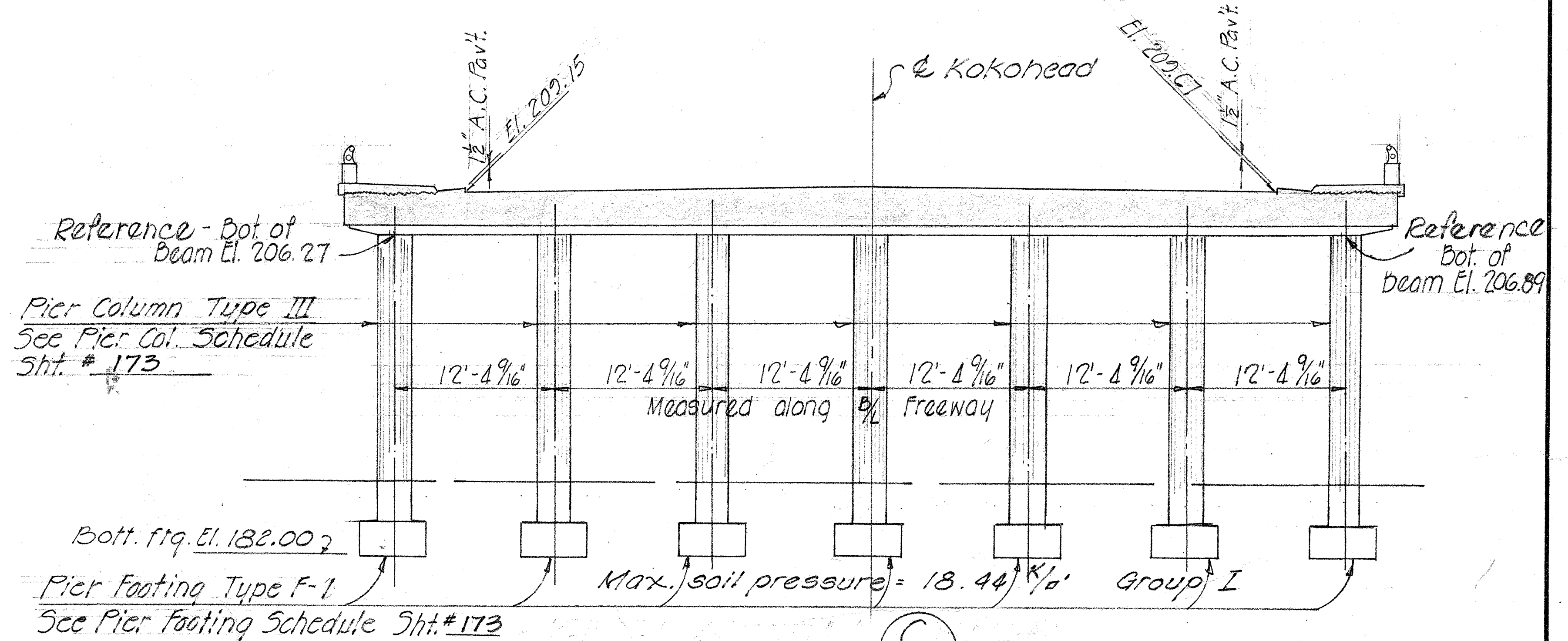
ELEVATION A/B9 ABUTMENT #1
Scale : 1" = 10'-0"


1½" A.C. Pav't.
El. 211.50
℄ Kokohead
El. 210.38
1½" A.C. Pav't.
Constr. Jt. El. 208.74
Constr. Jt. El. 208.08
Cont. Control Joint at both faces of the wall See Typical Detail Sht. # 173
4"⌀ tile drains @ 10'-0" o.c. thruout
Approx. finish grade
Bott. Ftg. El. 182.00

ELEVATION B/B9 ABUTMENT #2
Scale : 1" = 10'-0"


℄ Pier
Face of Abut. #1
Face of Abut. #2
1¼" Parabolic dead load Camber
1¼" Parabolic dead load Camber

CAMBER DESIGN
NO SCALE


1½" A.C. Pav't.
El. 209.15
℄ Kokohead
El. 209.67
1½" A.C. Pav't.
Reference - Bot. of Beam El. 206.27
Reference Bot. of Beam El. 206.89
Pier Column Type III See Pier Col. Schedule Sht. # 173
12'-4 9/16"
12'-4 9/16"
12'-4 9/16"
12'-4 9/16"
12'-4 9/16"
12'-4 9/16"
Measured along ℄ Freeway
Bott. Ftg. El. 182.00
Pier Footing Type F-1 See Pier Footing Schedule Sht. # 173
Max. soil pressure = 18.44 K/□' Group I

ELEVATION C/B9 PIER
Scale : 1" = 10'-0"

ESTIMATED QUANTITIES

Class A-1 Concrete	Lump Sum	(1,323	c.y.)
Reinforcing Steel	Lump Sum	(231,846	lbs.)
Structural Excavation		808	c.y.
Bituminous Tack Coat		187.	gals.
Asphaltic Paving Mix V		65.	Tons.
Asphaltic Paving Mix III		116.	Tons
Filter Material		153	c.y.
Concrete Railing		316.	lin. ft.
Metal Bridge Railing		309	lin. ft.

REFERENCE NOTE!
Top of concrete deck to follow roadway grade-
for typical details & general notes, see sht. #173

APPROVED:

Norman C. W. Kaw 5/1/63
PRINCPL. DISTR. ENG'R., H.E.Co. Ltd. DATE

F. H. Judd 4-30-63
PLANT ENG'G. SUPV., H.T.Co. Ltd. DATE

DATE

ESTIMATED QUANTITIES

ITEM	Retaining Wall No. 13 IB		Retaining Wall No. 13 OB	
Class A-1 Concrete	13	c.y.	11.	c.y.
Reinforcing Steel	1,008	lbs.	1,008	lbs.
Filter Material	6	c.y.	6	c.y.
Structural Excavation	59	c.y.	48.	c.y.

This Sheet Supersedes Sheet No. 170

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURE № 13
KOKO HEAD AVE. SEPARATION
℄ Sta. 108 + 59.62
LUNALILO FREEWAY Proj. No. I-HI-1(4):24
SEPT. 1962

SHEET No. B9 OF SHEETS

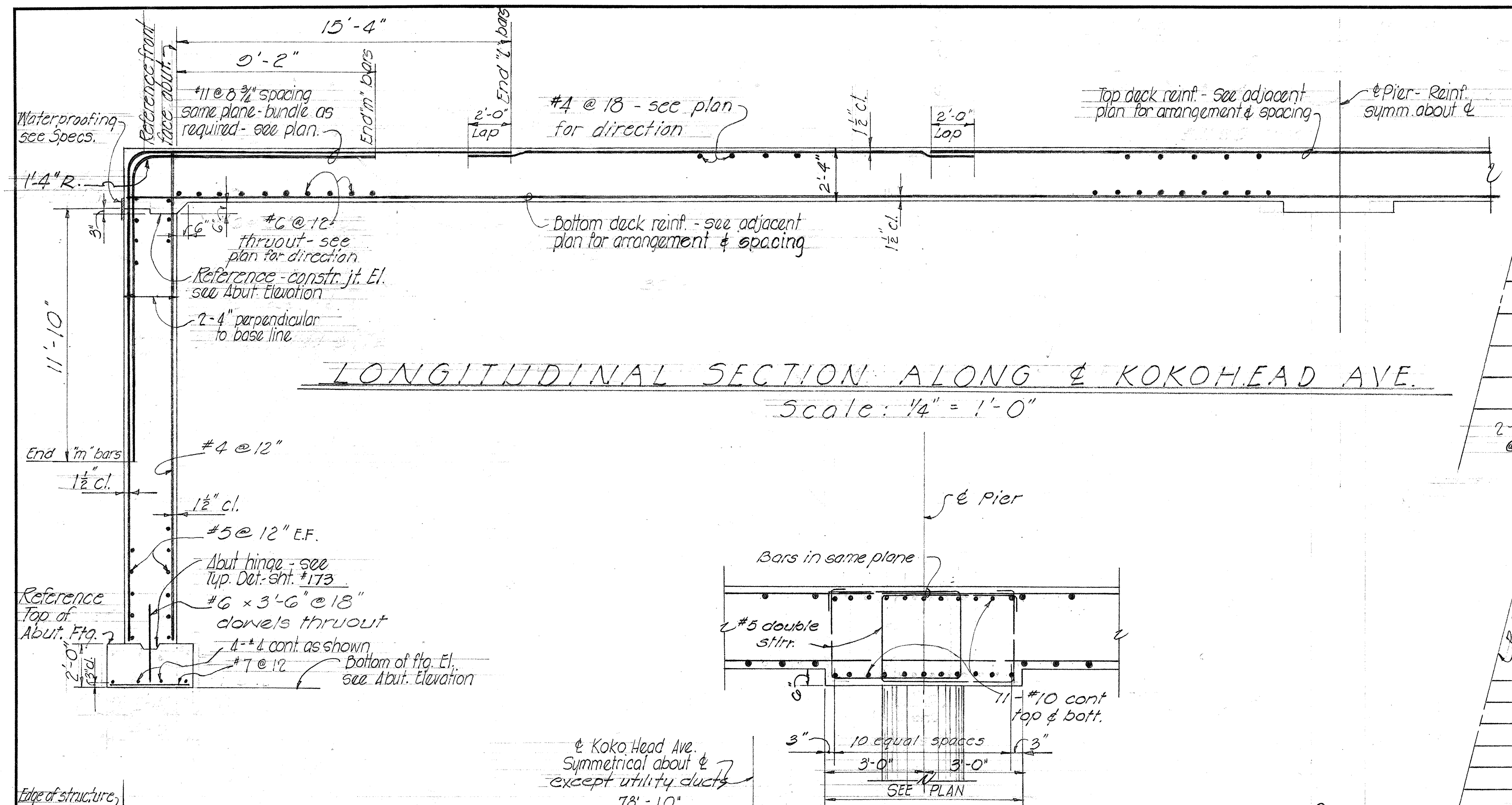
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY S. Yong	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY C.R.Y. T.U.	"
	QUANTITIES BY S.Y.	"
No.	CHECKED BY P. Yamashita J.T.O.	"

PRINTED ON CLEARPRINT 1000-H

170S

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	171	217

REVISED:
DEC. 13, 1963

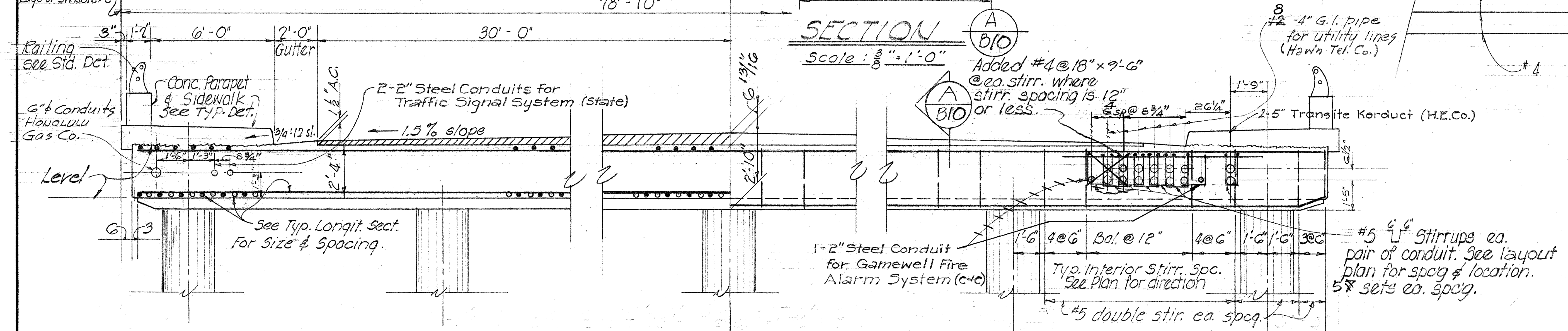

15'-4"
9'-2"
End "L" bars
End "m" bars
Reference front face abut.
Waterproofing see Specs.
#11 @ 8¾" spacing same plane - bundle as required - see plan.
2'-0" Lap
#4 @ 18 - see plan for direction
1½" cl.
2'-4"
Top deck reinf. - See adjacent plan for arrangement & spacing
℄ Pier - Reinf. symm. about ℄
1'-4" R.
3"
6"
#6 @ 12 thruout - see plan for direction
Reference - constr. jt. El. see Abut. Elevation
2-4" perpendicular to base line
Bottom deck reinf. - see adjacent plan for arrangement & spacing
11'-10"
End "m" bars
1½" cl.
#4 @ 12"
1½" cl.
#5 @ 12" E.F.
Abut hinge - see Typ. Det. - Sht. #173
#6 × 3'-6" @ 18" dowels thruout
Reference Top of Abut. Ftg.
4-#4 cont. as shown
#7 @ 12
2'-0"
3" cl.
Bottom of ftg. El. see Abut. Elevation
℄ Pier
Bars in same plane
#5 double stirr.
6"
11-#10 cont top & bott.
3"
10 equal spaces
3'-0"
3'-0"
3"
SEE PLAN

LONGITUDINAL SECTION ALONG ℄ KOKOHEAD AVE.

Scale: 1/4" = 1'-0"

SECTION A/B10

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

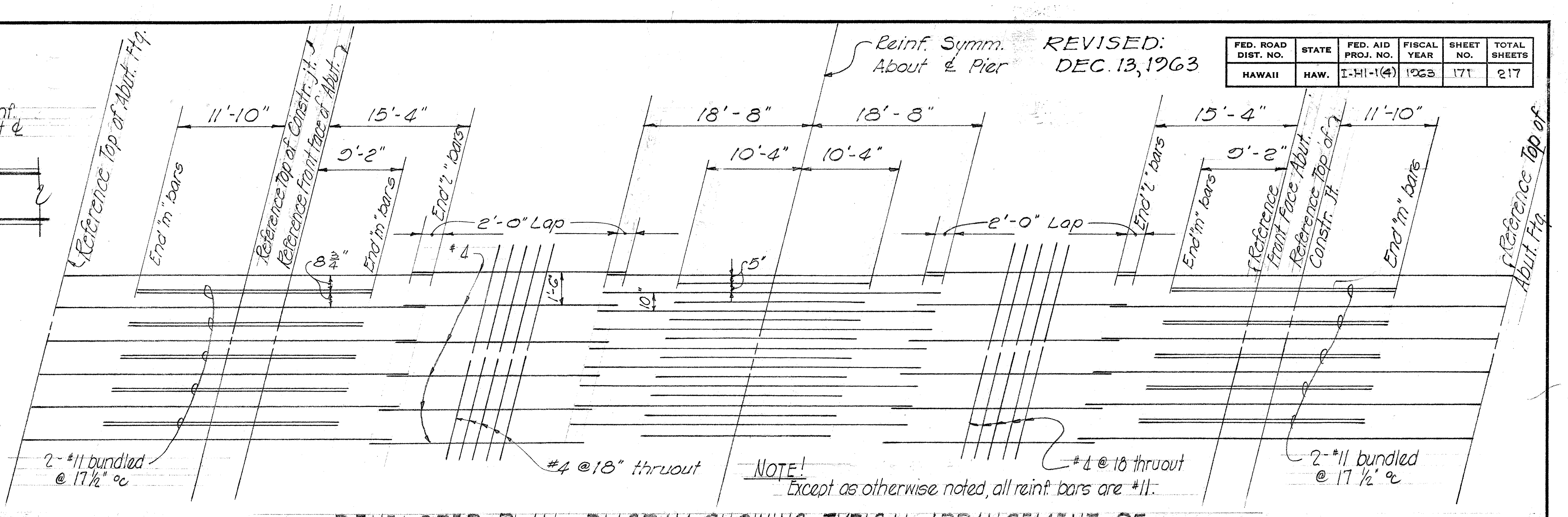

℄ Koko Head Ave. Symmetrical about ℄ except utility ducts
78'-10"
Edge of structure
3"
1'-2"
6'-0"
2'-0"
Gutter
30'-0"
Railing see Std. Det.
Conc. Parapet & Sidewalk See Typ. Det.
6"ϕ Conduits Honolulu Gas Co.
1½" A.C.
3/4:12 sl.
2-2" Steel Conduits for Traffic Signal System (State)
1.5% slope
1'-6"
1'-3"
8¾"
1'-3"
2'-4"
Level
6
3
See Typ. Longit. Sect. For Size & Spacing.
6 13/16
2'-10"
A
B10
Added #4 @ 18" × 9'-6" @ ea. stirr. where stirr. spacing is 12" or less.
4 Sp @ 8¾"
26¼"
1'-9"
8/12 -4" G.I. pipe for utility lines (Hawn Tel. Co.)
2-5" Transite Korduct (H.E.Co.)
6½"
1'-5"
1-2" Steel Conduit for Gamewell Fire Alarm System (c-c)
1'-6"
4 @ 6"
Bal. @ 12"
4 @ 6"
1'-6"
1'-6"
3 @ 6"
Typ. Interior Stirr. Spc. See Plan for direction
#5 double stir. ea. spcg.
#5 U Stirrups ea. pair of conduit. See layout plan for spcg & location. 5/7 sets ea. spcg.
6"
6"

MID-SPAN

PIER CAP REINF.

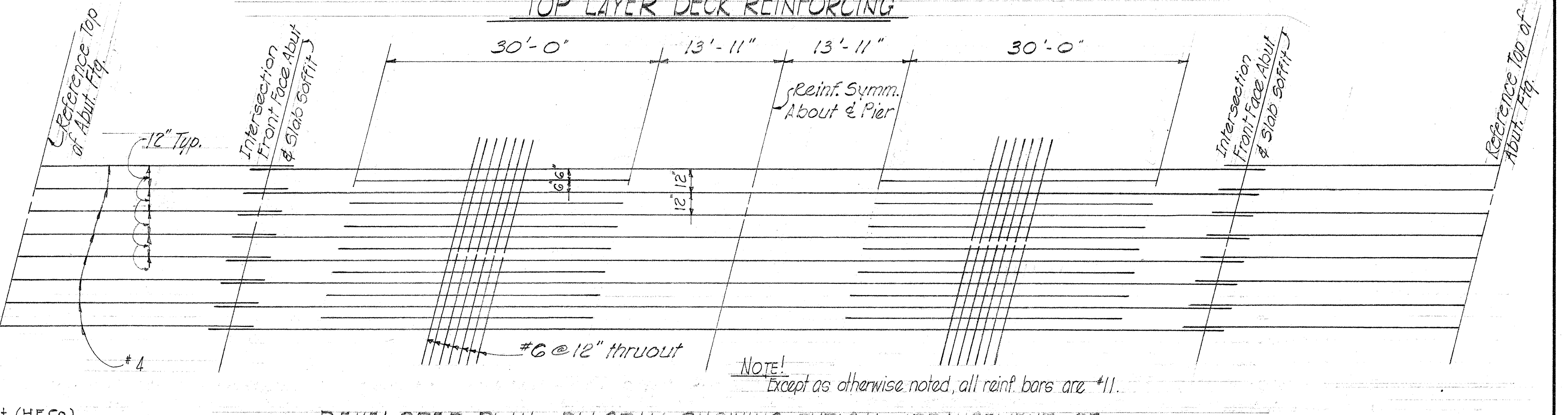
NORMAL SECTION ~ KOKOHEAD AVE.

Scale: 1/4" = 1'-0"


Reinf. Symm. About ℄ Pier
Reference Top of Abut. Ftg.
11'-10"
Reference Top of Constr. Jt.
Reference Front Face of Abut.
15'-4"
9'-2"
End "m" bars
End "m" bars
End "L" bars
8¾"
2'-0" Lap
#4
1'-6"
18'-8"
18'-8"
10'-4"
10'-4"
5"
10"
2'-0" Lap
End "L" bars
15'-4"
9'-2"
End "m" bars
Reference Front Face Abut.
Reference Top of Constr. Jt.
11'-10"
End "m" bars
Reference Top of Abut. Ftg.
2-#11 bundled @ 17½" c
#4 @ 18" thruout
#4 @ 18 thruout
2-#11 bundled @ 17½" c

NOTE!
Except as otherwise noted, all reinf. bars are #11.

DEVELOPED PLAN ~ DIAGRAM SHOWING TYPICAL ARRANGEMENT OF TOP LAYER DECK REINFORCING


Reference Top of Abut. Ftg.
12" Typ.
Intersection Front Face Abut & Slab Soffit
30'-0"
13'-11"
13'-11"
30'-0"
Reinf. Symm. About ℄ Pier
6"
6"
12"
12"
Intersection Front Face Abut & Slab Soffit
Reference Top of Abut. Ftg.
#4
#6 @ 12" thruout

NOTE!
Except as otherwise noted, all reinf. bars are #11.

DEVELOPED PLAN ~ DIAGRAM SHOWING TYPICAL ARRANGEMENT OF BOTTOM LAYER DECK REINFORCING

This Sheet Supersedes Sheet No. 171S

APPROVED:

________________	DATE
Manuel Kan PRINCPL. DISTR. ENG'R., H.E.Co. Ltd.	5/1/63 DATE
F. H. Judd PLANT ENG'G. SUPV., H.T.Co. Ltd.	4-30-63 DATE
________________	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE No. 13
KOKO HEAD AVE. SEPARATION
BASE LINE STA. 108+59.62
Lunalilo Freeway Proj. No. I-H1-1(4):24
SEPT. 1962

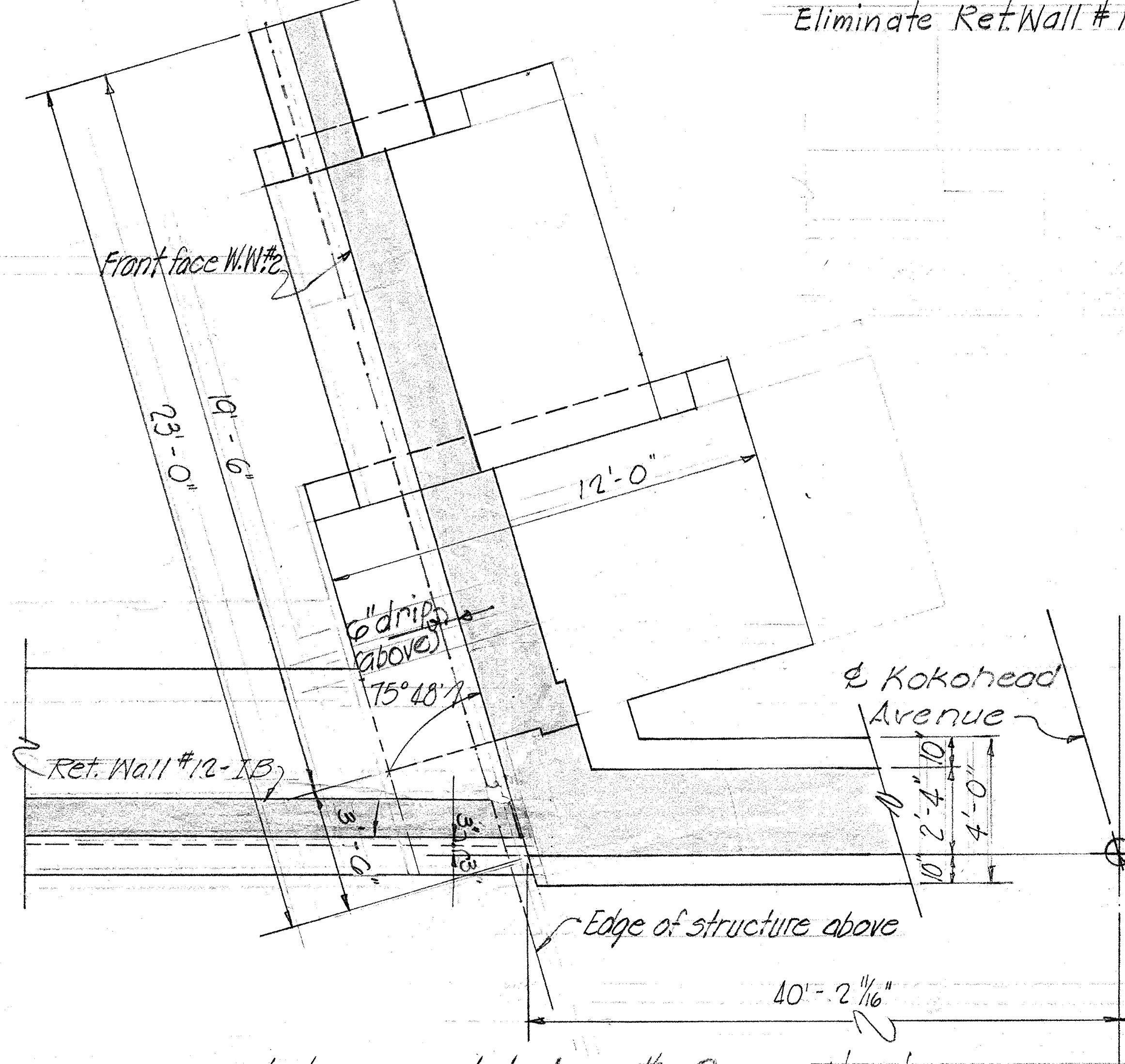
SHEET No. B10 OF 11 SHEETS

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY W. Bailey DATE J. Fukui
TRACED BY
DESIGNED BY C.R.Y.
QUANTITIES BY
CHECKED BY P. Yamashita J.T.O.

Revision № 1 12/27/63
Eliminated Ret. Wall #13 I.B. & #13 O.B.
Revised cut slope & Wing Wall #4.

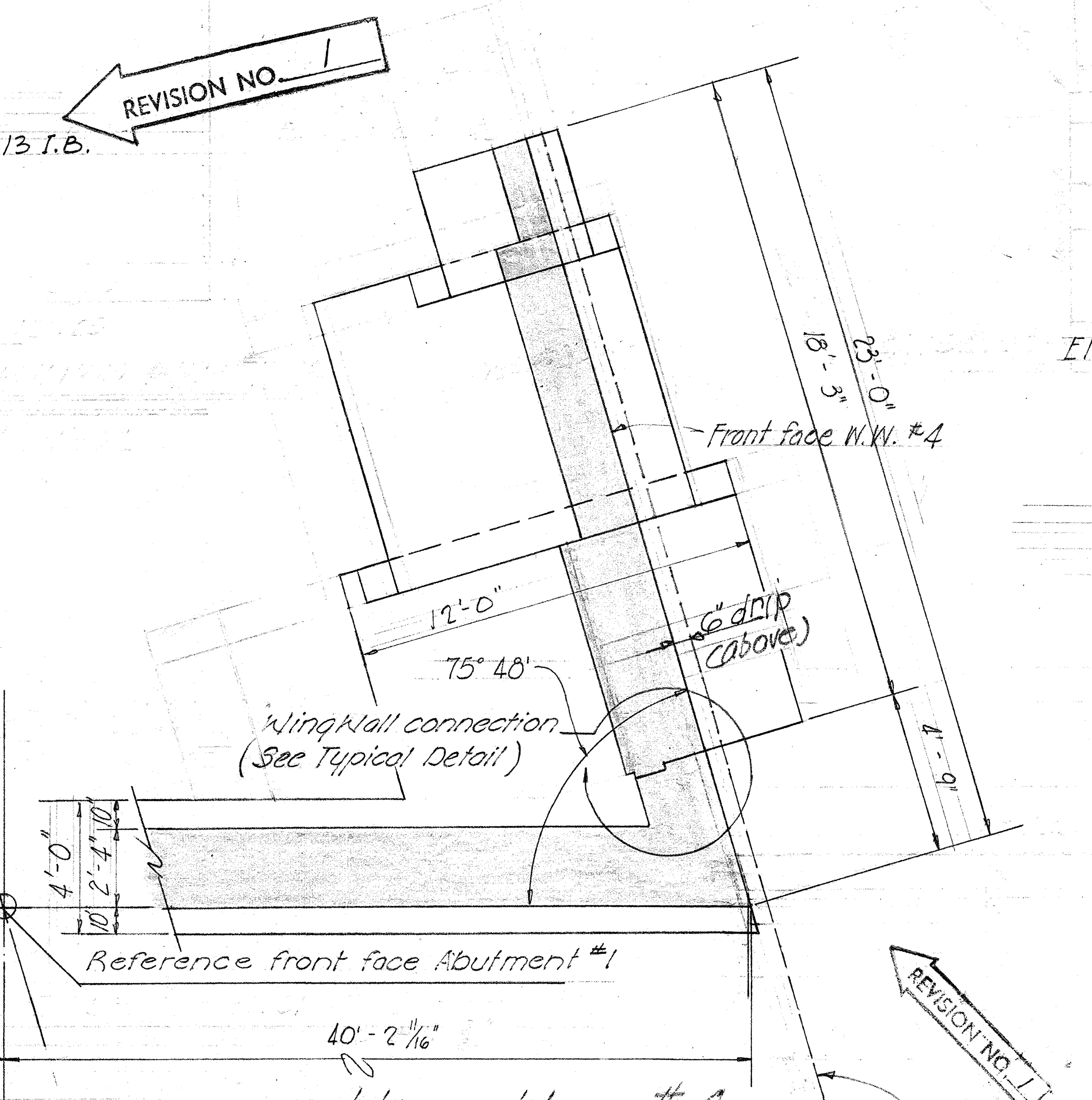
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	172	217

Revision No. 1
Eliminate Ret. Wall #13 I.B.


Front face W.W. #2
23'-0"
19'-6"
12'-0"
6" drip (above)
75° 48'
Ret. Wall #12 I.B.
Edge of structure above
℄ Kokohead Avenue
2'-4"
4'-0"
40'-2 1/16"

WING WALL #2

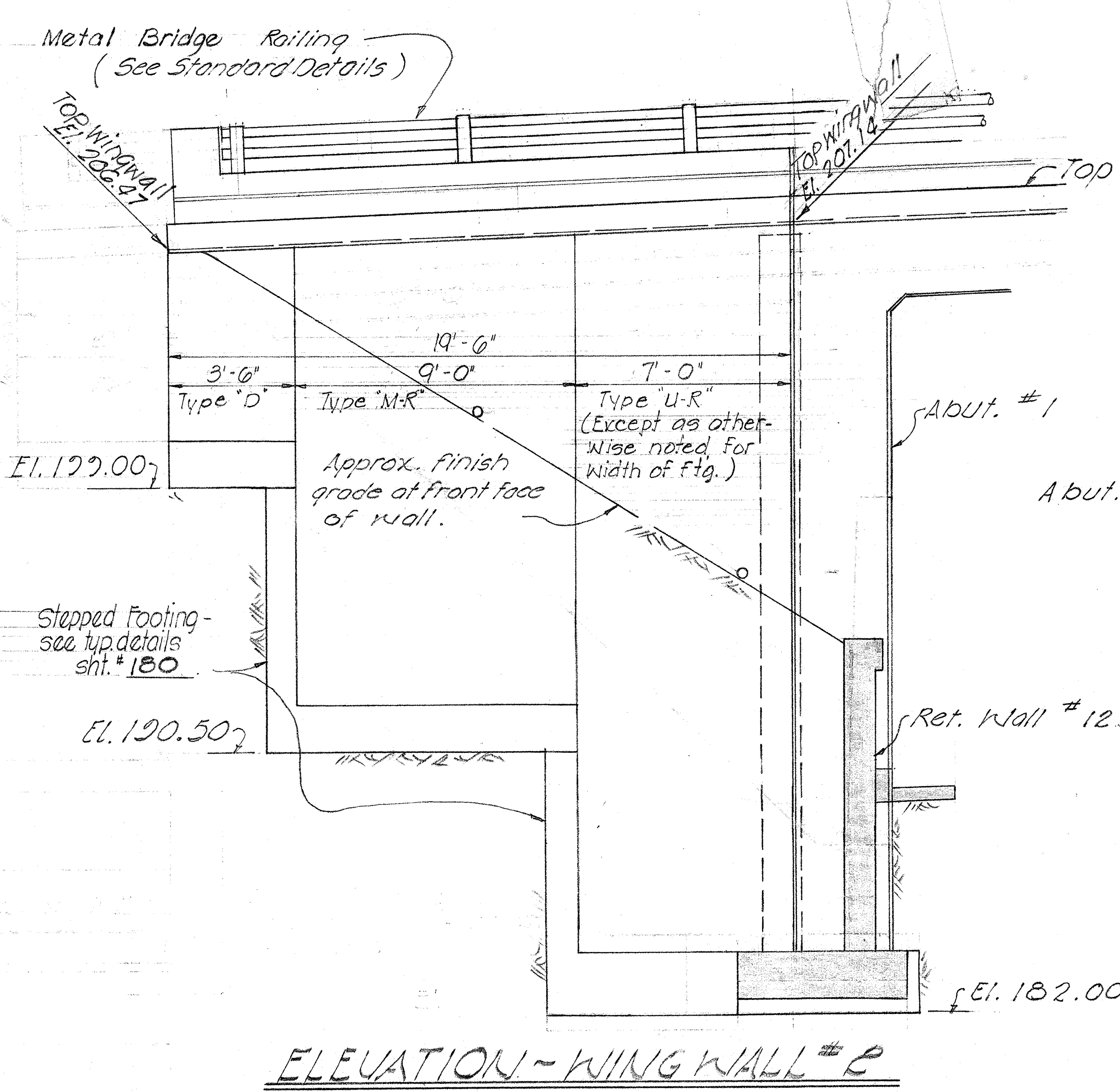
Scale: 1/4" = 1'-0"


REVISION NO. 1
23'-0"
19'-3"
Front face W.W. #4
12'-0"
6" drip (above)
75° 48'
Wing Wall connection (See Typical Detail)
4'-0"
2'-4"
Reference front face Abutment #1
40'-2 1/16"
REVISION NO. 1

WING WALL #4

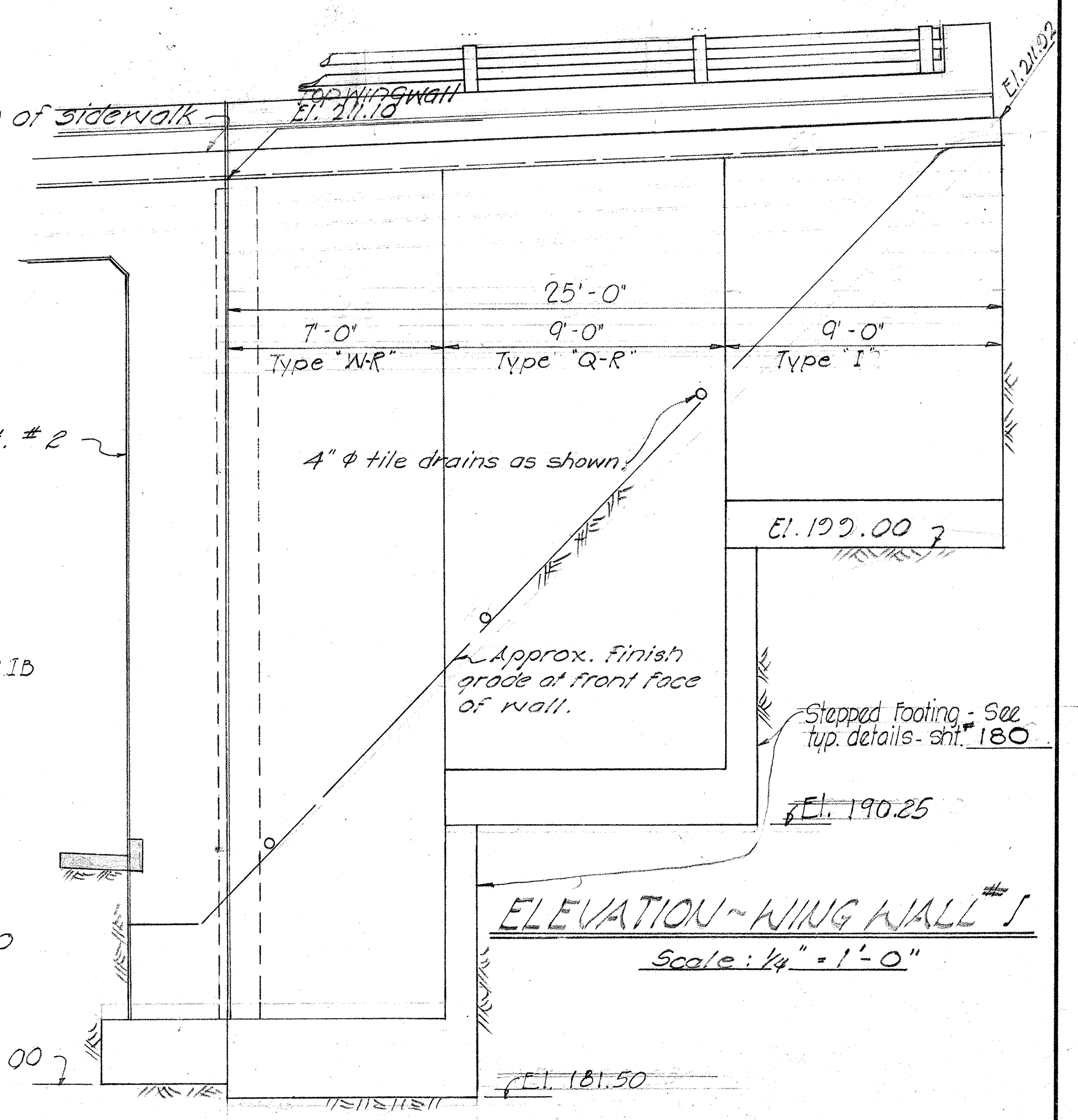
Scale: 1/4" = 1'-0"

NOTE:
Abutment, Retaining Wall, & Wing Wall footings will be poured monolithically, where it occurs.


Metal Bridge Railing (See Standard Details)
Top Wingwall El. 206.97
Top Wingwall El. 207.14
3'-6"
Type "D"
19'-6"
9'-0"
Type "M-R"
7'-0"
Type "U-R" (Except as otherwise noted for width of ftg.)
El. 199.00
Approx. finish grade at front face of wall.
Abut. #1
Stepped footing - see typ. details sht. #180
El. 190.50
Ret. Wall #12 I.B.
El. 182.00

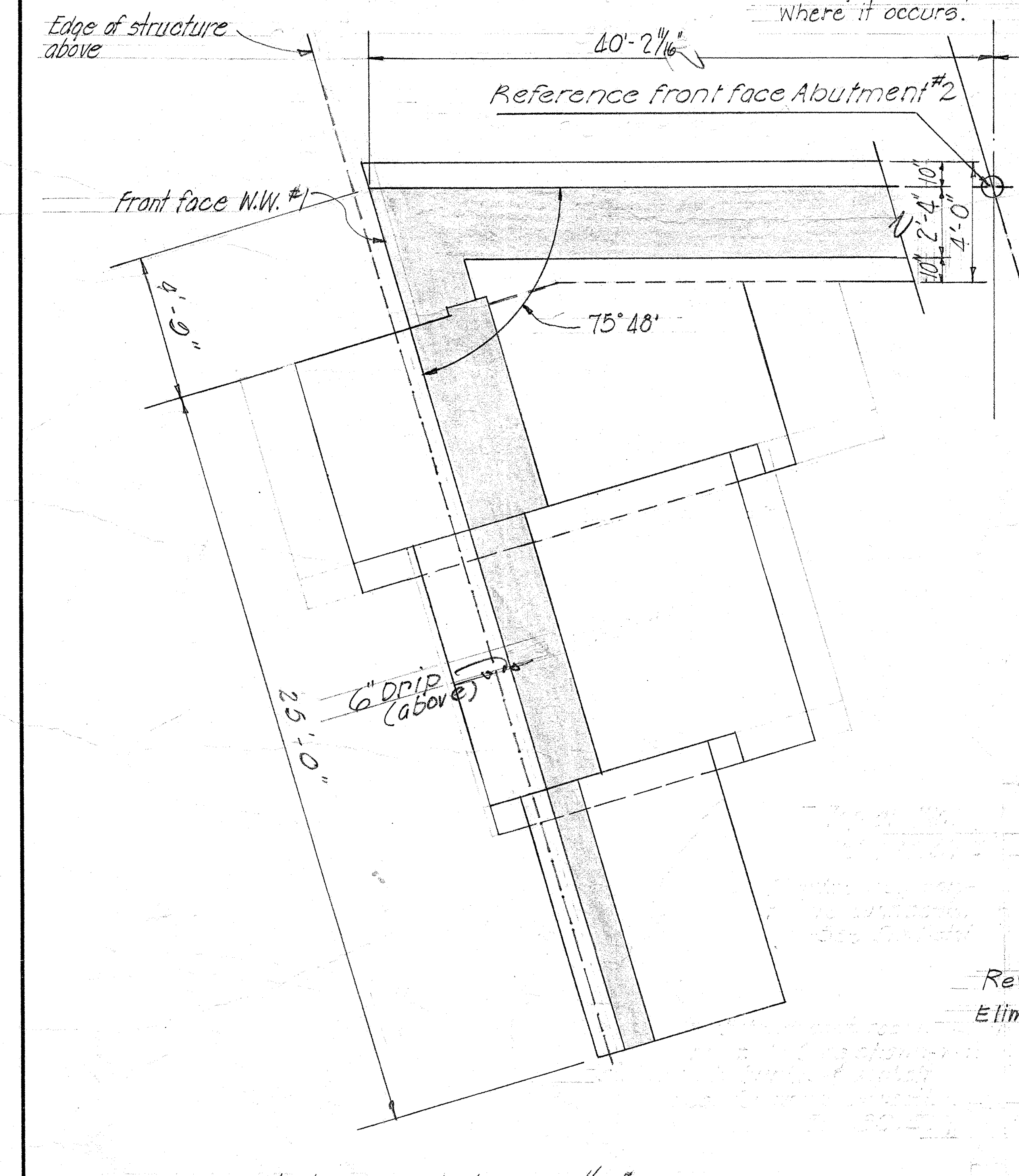
ELEVATION ~ WING WALL #2

Scale: 1/4" = 1'-0"


Top of Sidewalk
Top Wingwall El. 211.10
El. 211.92
Abut. #2
25'-0"
7'-0"
Type "W-R"
9'-0"
Type "Q-R"
9'-0"
Type "I"
4" ф tile drains as shown
El. 199.00
Approx. finish grade at front face of wall.
Stepped footing - See typ. details - sht. #180
El. 190.25
El. 182.00
El. 181.50

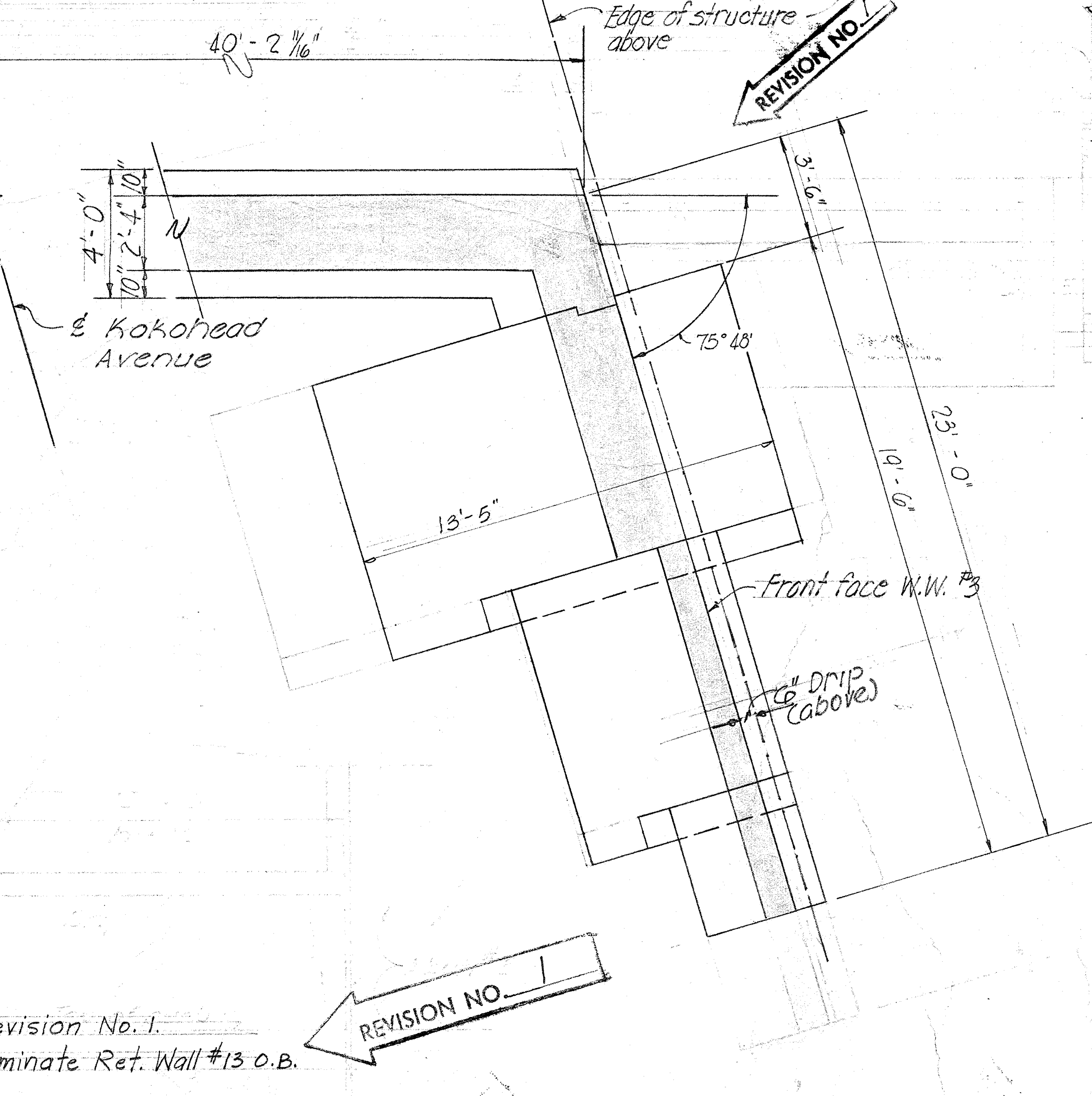
ELEVATION ~ WING WALL #1

Scale: 1/4" = 1'-0"


Edge of structure above
40'-2 1/16"
Reference front face Abutment #2
Front face W.W. #1
6'-0"
75° 48'
2'-4"
4'-0"
6" drip (above)
25'-0"

WING WALL #1

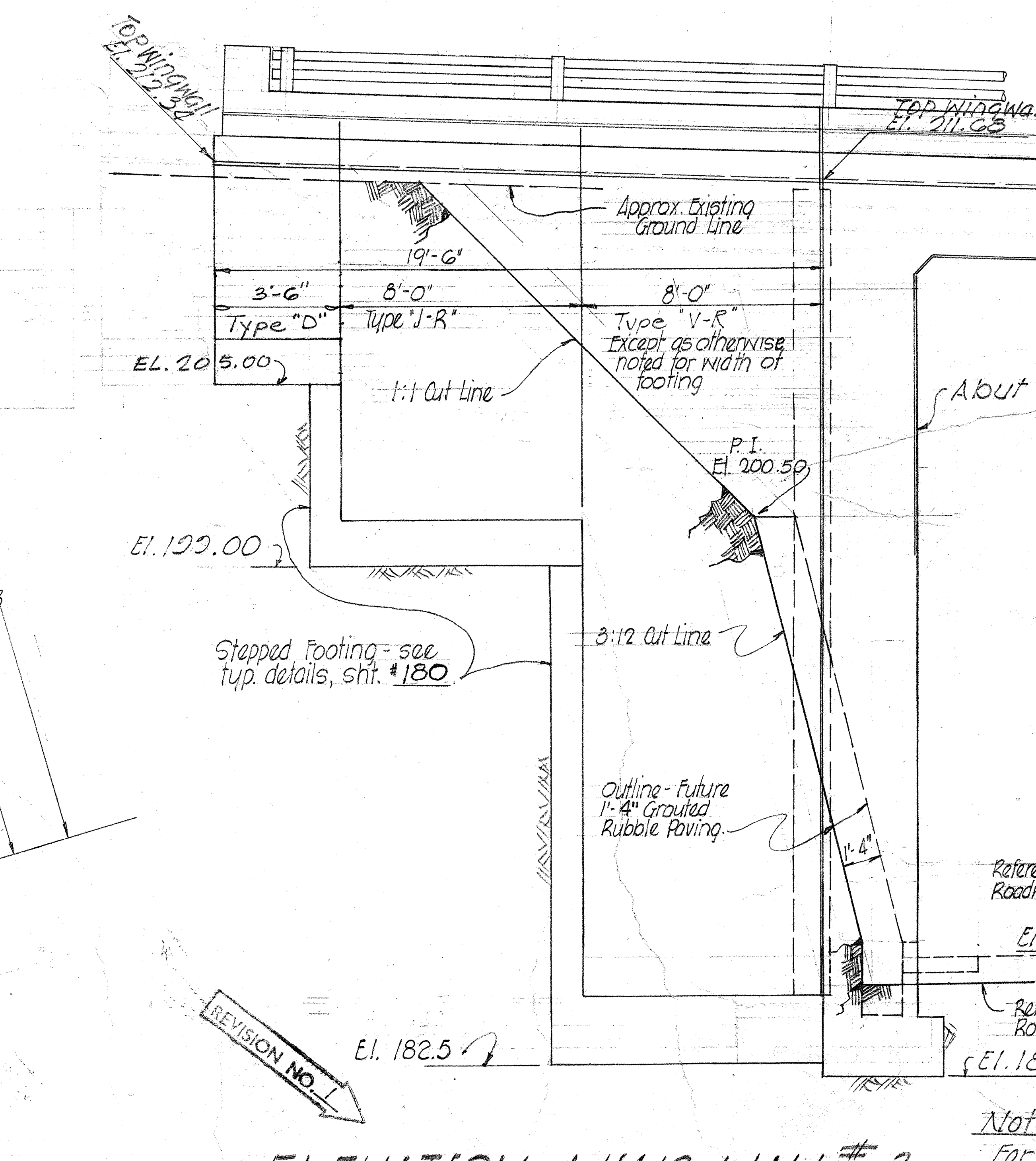
Scale: 1/4" = 1'-0"


40'-2 1/16"
Edge of structure above
REVISION NO. 1
3'-6"
4'-0"
2'-4"
℄ Kokohead Avenue
75° 48'
13'-5"
23'-0"
19'-6"
Front face W.W. #3
6" drip (above)
REVISION NO. 1

Revision No. 1.
Eliminate Ret. Wall #13 O.B.

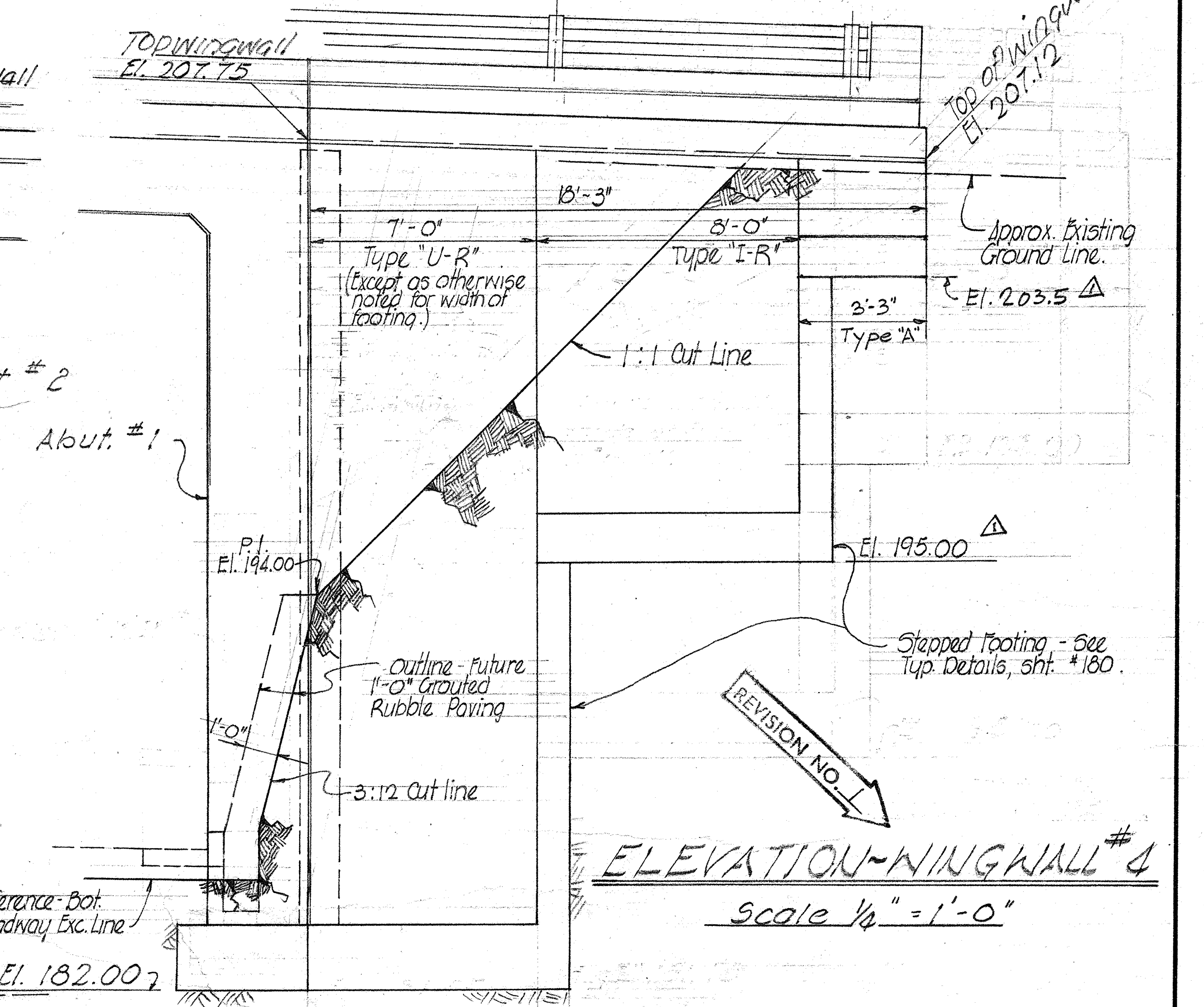
WING WALL #3

Scale: 1/4" = 1'-0"


Top Wingwall El. 207.32
Top Wingwall El. 211.63
Approx. Existing Ground Line
3'-6"
Type "D"
19'-6"
8'-0"
Type "J-R"
8'-0"
Type "V-R" Except as otherwise noted for width of footing
EL. 205.00
1:1 Cut Line
Abut #2
P.I. El. 200.50
El. 199.00
3:12 Cut Line
Stepped footing - see typ. details, sht. #180
Outline - Future 1'-4" Grouted Rubble Paving
1'-6"
El. 182.5
Reference - Bot. Roadway Exc. Line
El. 182.00
REVISION NO. 1

ELEVATION ~ WING WALL #3

Scale: 1/4" = 1'-0"


Top Wingwall El. 207.75
Top of Wingwall El. 207.12
7'-0"
Type "U-R" (Except as otherwise noted for width of footing.)
13'-3"
8'-0"
Type "I-R"
Approx. Existing Ground Line.
El. 203.5
3'-3"
Type "A"
1:1 Cut Line
Abut. #1
P.I. El. 194.00
El. 195.00
Stepped footing - See Typ. Details, sht. #180
Outline - Future 1'-0" Grouted Rubble Paving
1'-0"
3:12 Cut Line
REVISION NO. 1
Reference - Bot. Roadway Exc. Line
El. 182.00

ELEVATION ~ WINGWALL #4

Scale 1/4" = 1'-0"

Note:
For Wingwall #1, #2, #3 & #4 details & reinf., refer to Retaining Wall Standard Type (Footing on Rock) Sht. #180

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURE № 13
KOKOHEAD AVE. SEPARATION
℄ Sta. 108 + 59.62
LUNALILO FREEWAY Proj. No. I-H1-1(4) : 24
Sept. 1962

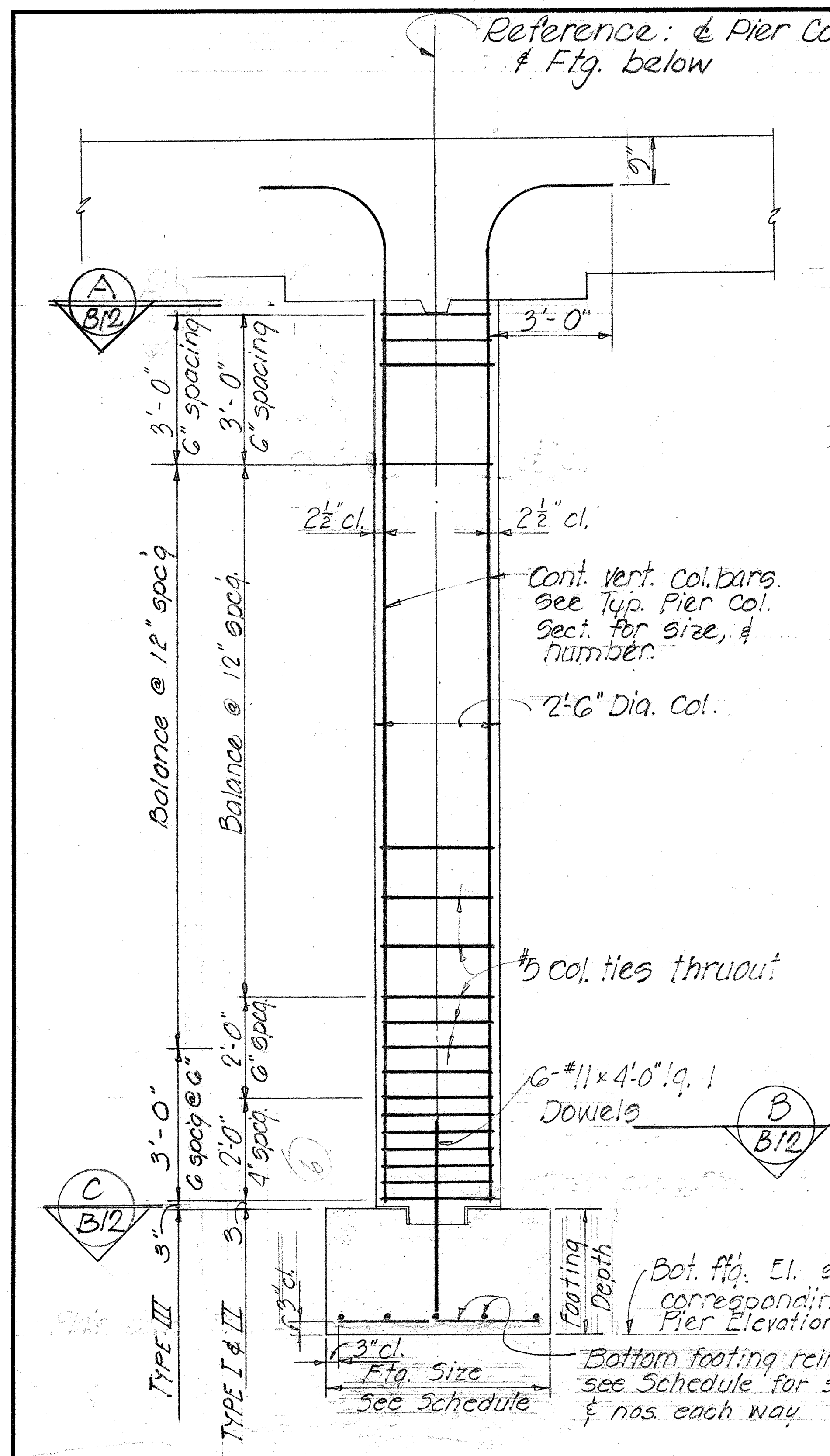
This sheet supersedes sheet No. 172.

SHEET No. 811 OF SHEETS

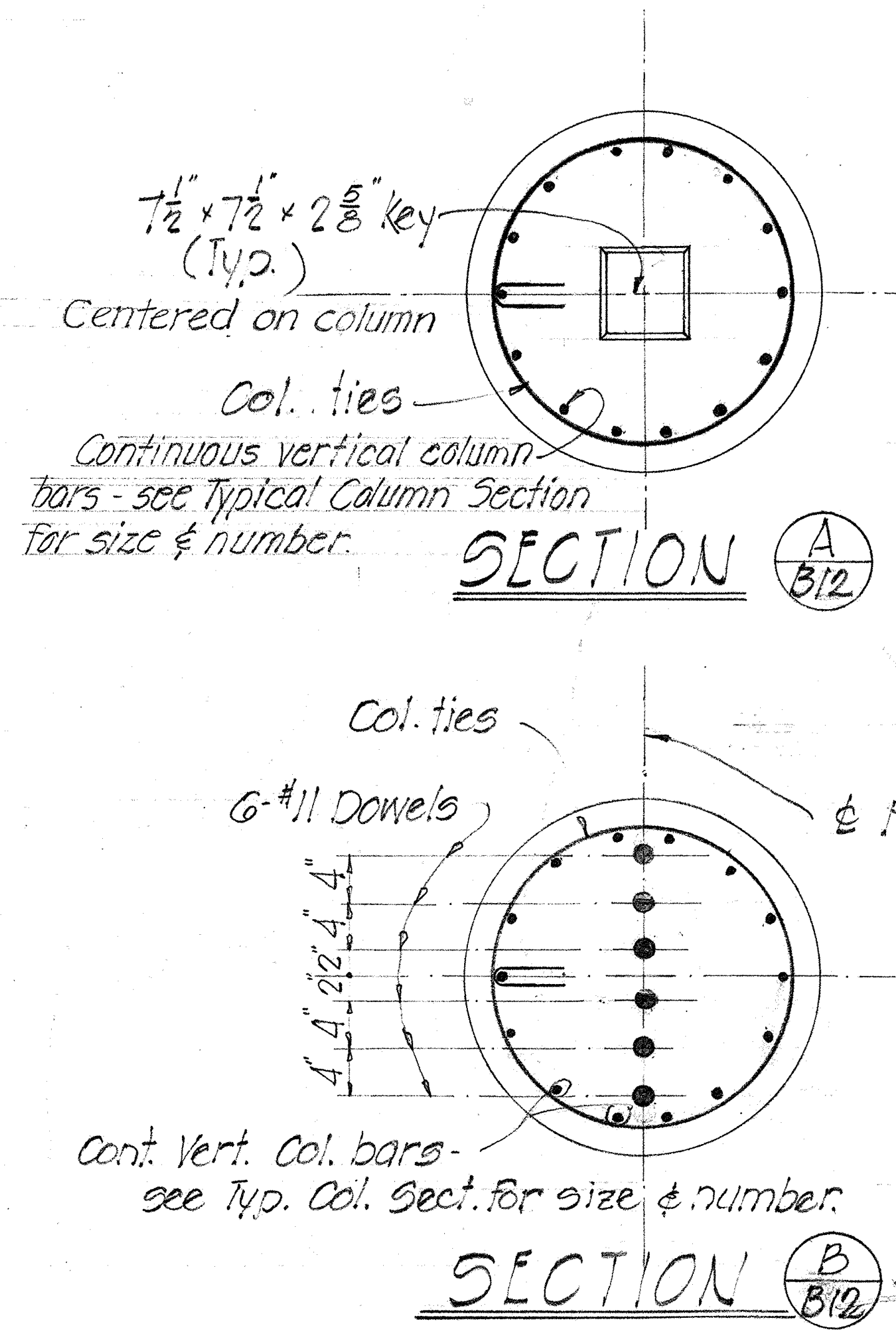
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY W. Bailey	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY T.M.	"
	QUANTITIES BY S.Y. M.Y.	"
No.	CHECKED BY P. Yamashita J.T.O.	"

PRINTED ON CLEARPRINT 1000-H

172S


Reference: ℄ Pier Col. & Ftg. below
2"
3'-0"
A B12
3'-0" 6" spacing
3'-0" 6" spacing
2½" cl.
2½" cl.
Cont. Vert. Col. bars. See Typ. Pier Col. Sect. for size, & number.
2'-6" Dia. Col.
Balance @ 12" spcg.
Balance @ 12" spcg.
#3 Col. ties thruout
6-#11 x 4'-0" lg. Dowels
B B12
C B12
3'-0" 6 spcg @ 6"
1'-0"
2'-0" 4 spcg.
Type III
Type I & II
3" cl.
Ftg. Size
See Schedule
Bot. ftg. El. see corresponding Pier Elevation
Footing Depth
Bottom footing reinf. - see Schedule for size & nos. each way

TYPICAL PIER COLUMN DETAILS

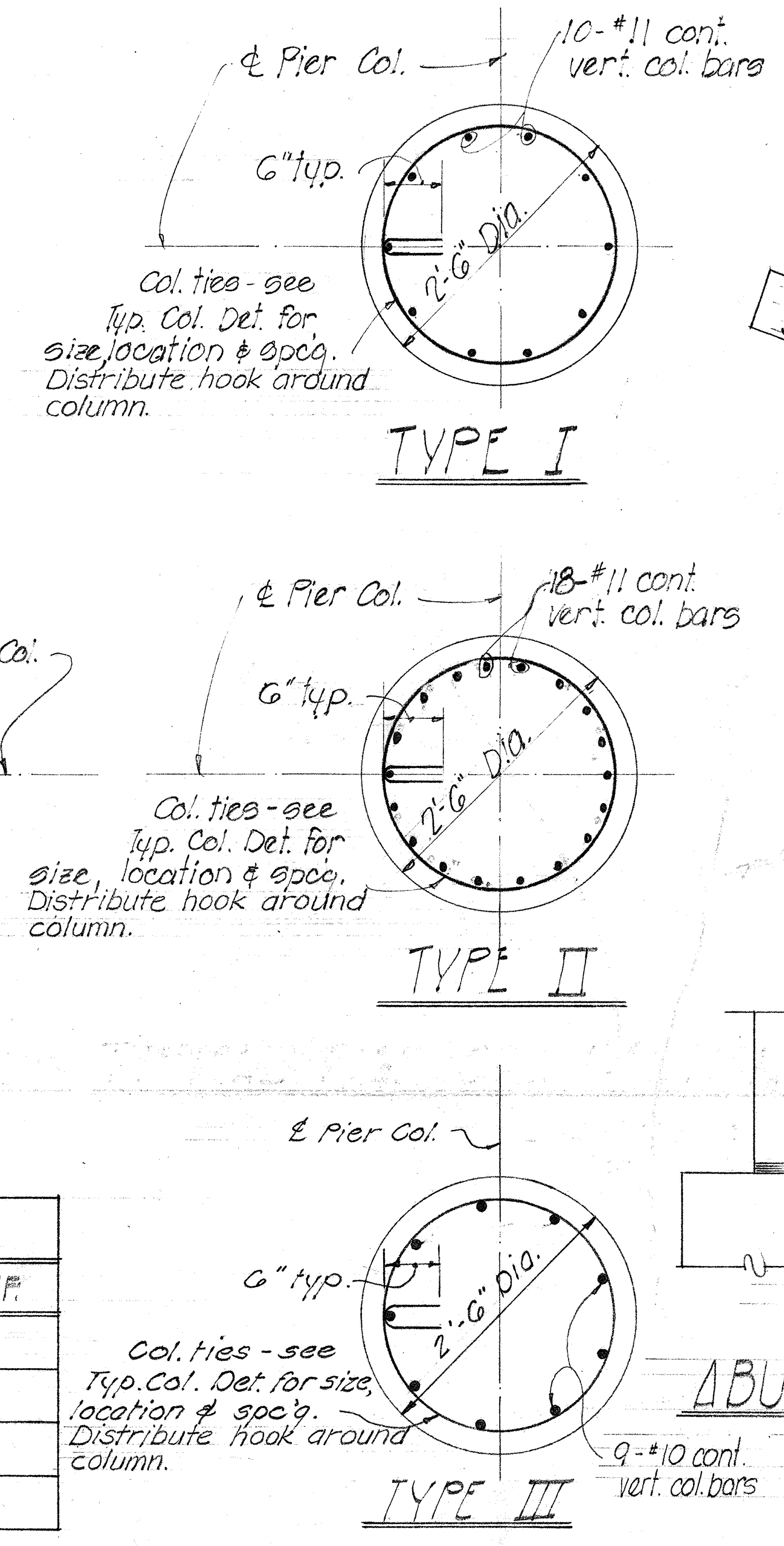

7½" x 7½" x 2⅝" key (Typ.)
Centered on column
Col. ties
Continuous vertical column bars - see Typical Column Section for size & number.
Col. ties
6-#11 Dowels
℄ Pier Col.
Cont. Vert. Col. bars - see Typ. Col. Sect. for size & number.

SECTION A/B12

SECTION B/B12

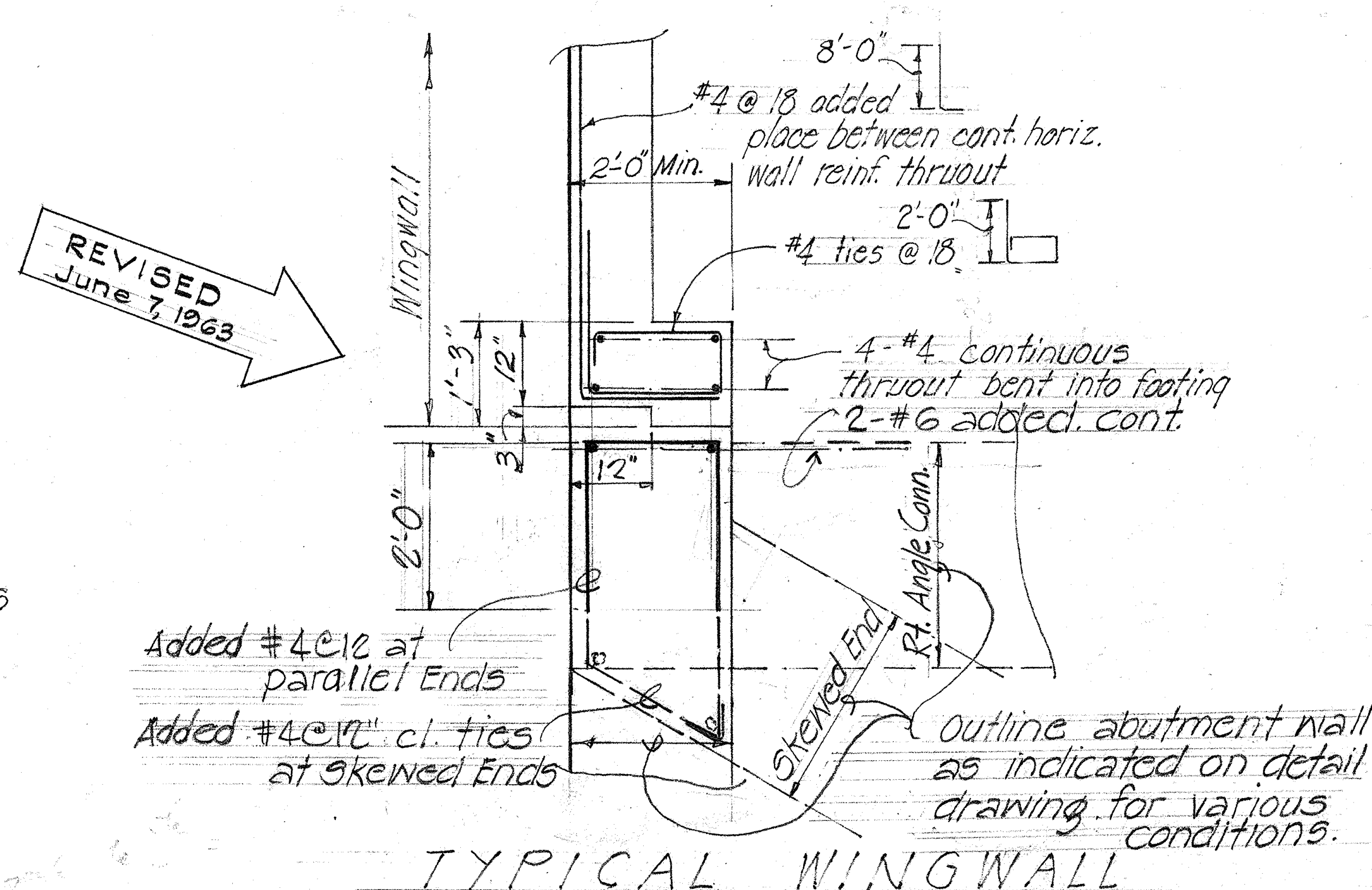
FOOTING SCHEDULE

MARK	SIZE	DEPTH	BOTTOM FOOTING REINF.
F-1	5'-0" x 5'-0"	2'-6"	11-#9 each way
F-2	5'-9" x 5'-9"	2'-6"	11-#8 each way

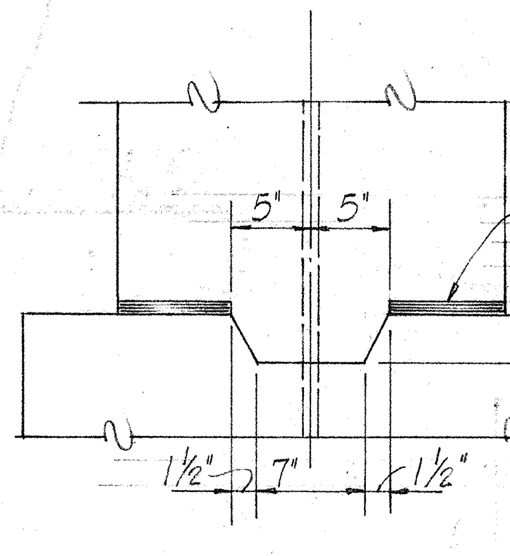

℄ Pier Col.
10-#11 cont. vert. col. bars
6" typ.
2'-6" Dia.
Col. ties - see Typ. Col. Det. for size, location & spcg. Distribute hook around column.
TYPE I
℄ Pier Col.
18-#11 cont. vert. col. bars
6" typ.
2'-6" Dia.
Col. ties - see Typ. Col. Det. for size, location & spcg. Distribute hook around column.
TYPE II
℄ Pier Col.
6" typ.
2'-6" Dia.
Col. ties - see Typ. Col. Det. for size, location & spcg. Distribute hook around column.
9-#10 cont. vert. col. bars
TYPE III

TYPICAL PIER COL. SECTIONS

REVISED June 7, 1963

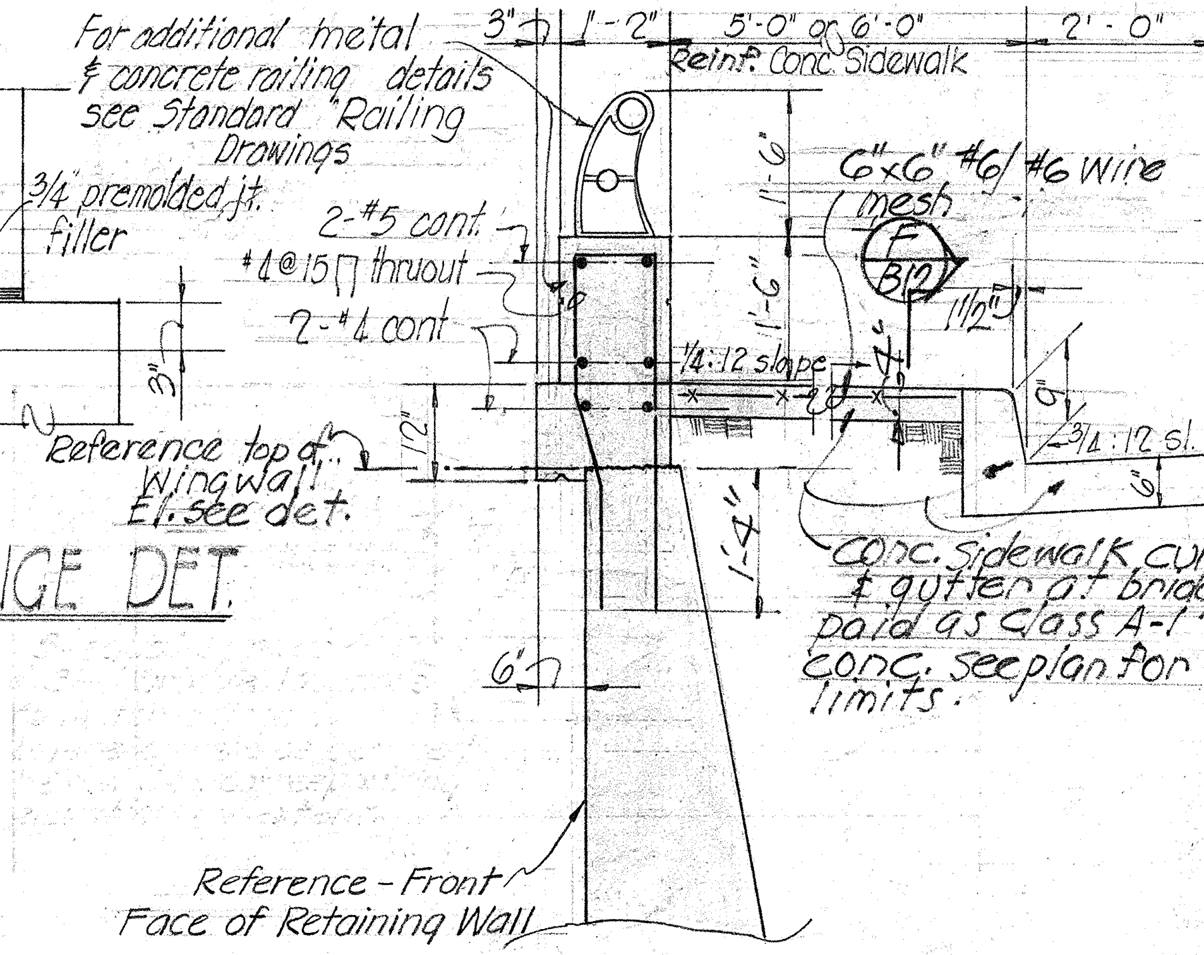

8'-0"
#4 @ 18 added place between cont. horiz. wall reinf. thruout
2'-0" Min.
2'-0"
#4 ties @ 18
Wingwall
4-#4 continuous thruout bent into footing
2-#6 added. cont.
12"
2'-0"
Added #4 @ 12 at parallel Ends
Added #4 @ 12 cl. ties at skewed Ends
Skewed End
Rt. Angle Conn.
Outline abutment wall as indicated on detail drawing for various conditions.

TYPICAL WINGWALL CONNECTION DETAIL


5'
5'
¾ premolded jt. filler
1½"
1½"

ABUTMENT HINGE DET.

SCALE: 1" = 1'-0"


For additional metal & concrete railing details see Standard Railing Drawings
3"
1'-2"
5'-0" or 6'-0"
Reinf. Conc. Sidewalk
2'-0"
6"x6" #6/#6 wire mesh
F B12
2-#5 cont.
#4 @ 15 thruout
2-#4 cont.
¼:12 slope
3¼:12 sl.
Reference top of Wingwall El. see det.
Conc. Sidewalk curb & gutter at bridge paid as Class A-1 Conc. see plan for limits.
Reference - Front Face of Retaining Wall

AT BRIDGE WING WALL

GENERAL NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	173 A	217

Revised: June 7, 1963

DESIGN SPECIFICATIONS:

Design is in accordance with AASHO Standard Specifications for Highway Bridges.

DESIGN LOADS:

H 20-S16-44 as defined in design specifications.

DESIGN STRESSES:

f'c = 3000 psi
fc = 1200 psi
n = 10
fs = 20,000 psi - tension

CONCRETE:

1. All concrete shall be Class A-1 unless otherwise noted.
2. Cover for reinforcing bars shall be as follows unless noted otherwise:
   1½" for slabs, stirrups on sides of beams, and walls not exposed to ground.
   2" for formed walls exposed to ground.
   2½" to main reinforcing of columns and beams.
   3" for footings
3. Reinforcing bars shall be detailed in accordance with ACI. "Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures" unless otherwise noted.
4. Reinforcing bars shall be securely tied at all intersections and splices and shall be held in place during pouring to maintain their proper locations as shown on plans.

CONSTRUCTION METHODS:

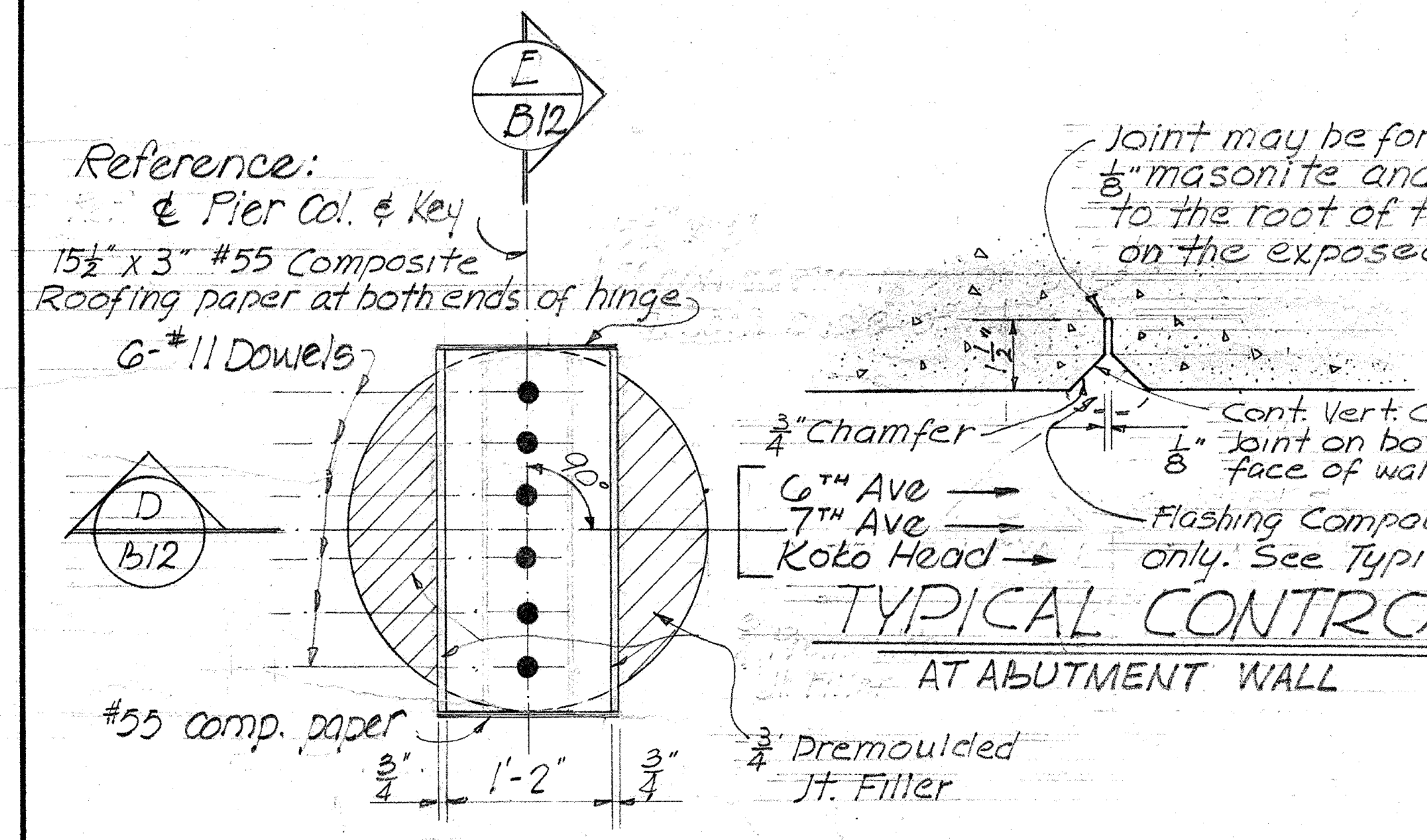
1. No backfill shall be placed behind abutments of rigid frame structures until concrete in superstructure has reached a strength of 3000 psi. The backfill must then be placed uniformly and simultaneously at each abutment of a rigid frame structure to avoid unequal lateral earth pressure.
2. Sides of footings shall be excavated and poured to neat lines when called for on the plans. For excavation of bottom of footings, see Standard Specifications. Over excavation beyond neat lines for sides of footings and the elevations indicated on the plans for the bottom of footings shall be backfilled with a minimum of Class D concrete at the Contractor's expense and as directed by the Engineer.
3. Forms for all exposed surfaces of separation structures including retaining walls (except round columns) shall be plywood. Forms for round columns shall be made of material that results in a smooth finish and true dimensions as shown in the plans.
4. Finish: see Standard Specifications.

CAMBER:

Obtain camber by forming and shoring concrete surfaces above profile grades amount shown in camber diagram.

PROTECTION OF PROPERTY:

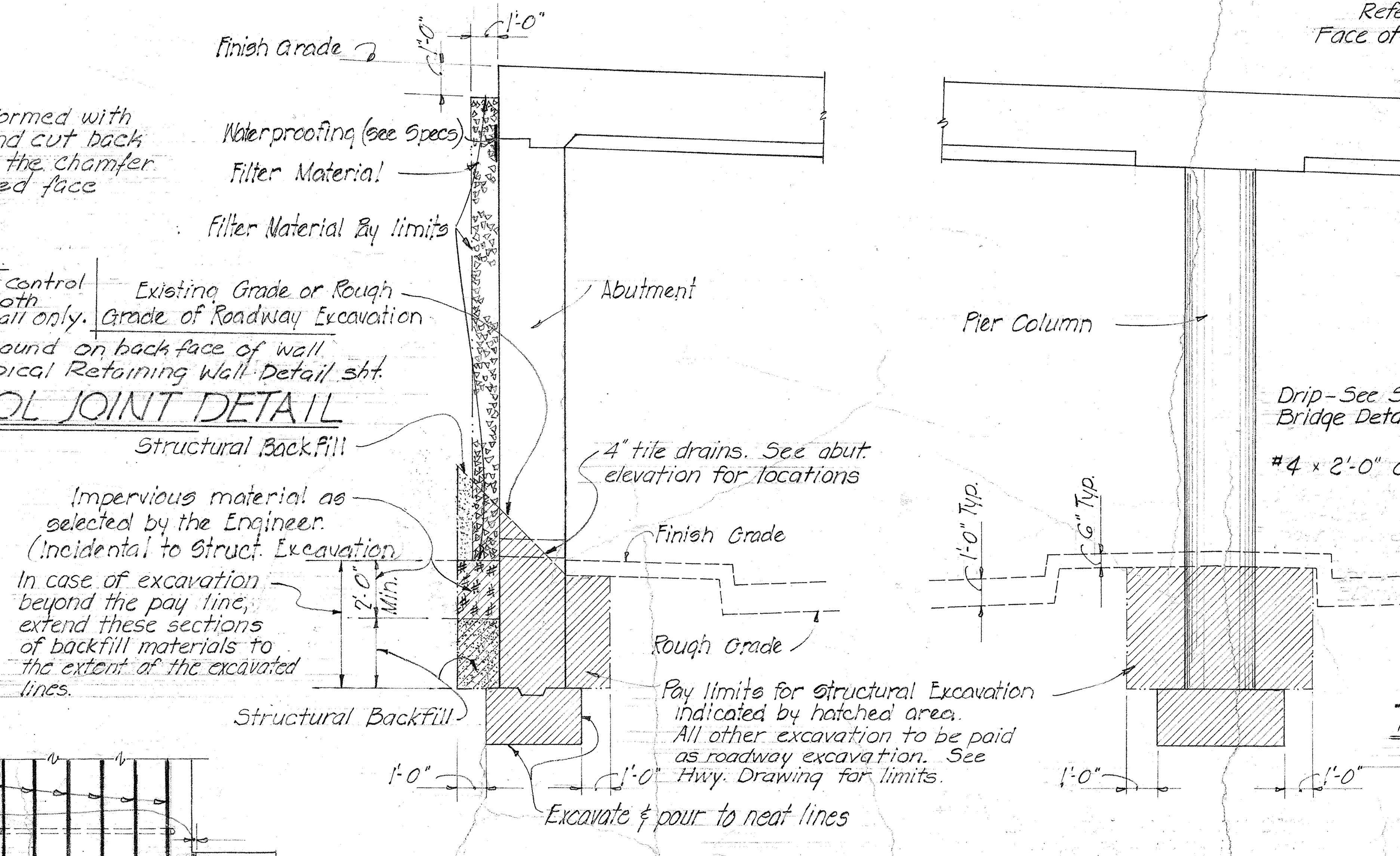
The contractor shall be solely responsible for the protection of adjacent property and structures from damage due to construction and shall repair any damage at his own expense. He shall conduct his work in such a manner and provide such temporary shoring or other measures as may be necessary to insure the safety of adjacent property.


E B12
Reference: ℄ Pier Col. & Key
15¾" x 3" #55 Composite Roofing paper at both ends of hinge
6-#11 Dowels
D B12
#55 comp. paper
¾"
1'-2"
¾"
¾" Premoulded Jt. Filler
Joint may be formed with ½" masonite and cut back to the root of the chamfer on the exposed face
¾" Chamfer
6TH Ave
7TH Ave
Koko Head
Cont. Vert. Control Joint on both face of wall only.
Existing Grade or Rough Grade of Roadway Excavation
Flashing Compound on back face of wall only. See Typical Retaining Wall Detail sht.

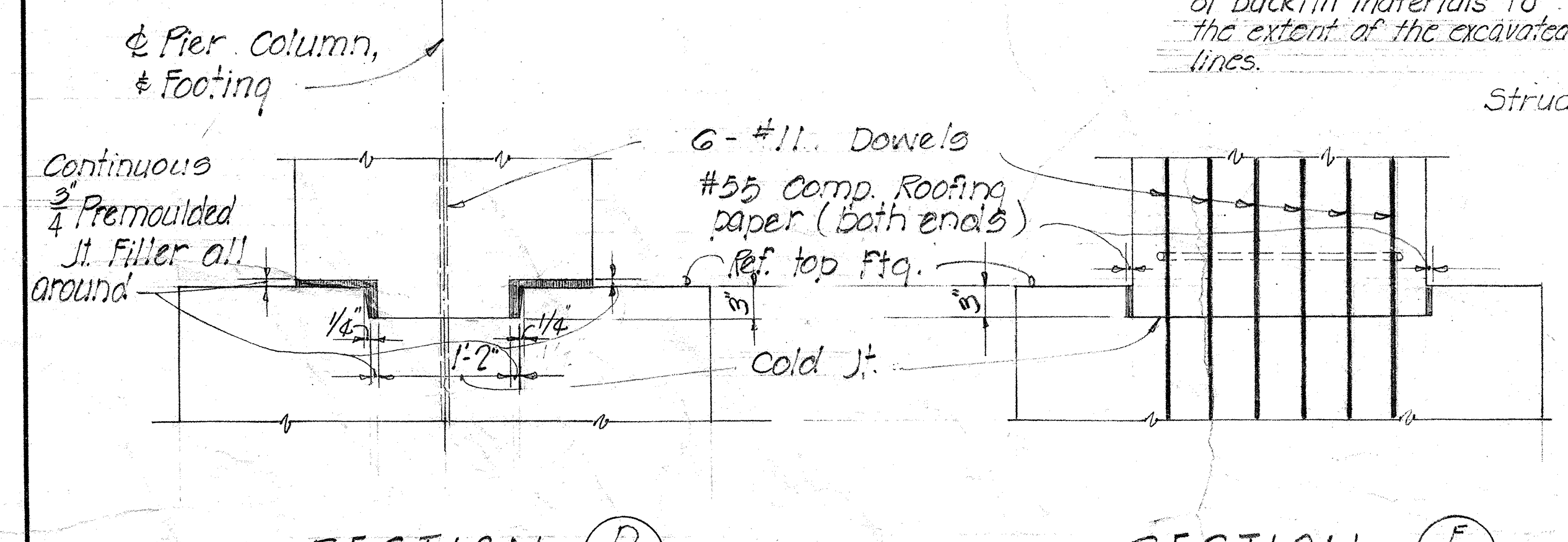
TYPICAL CONTROL JOINT DETAIL

AT ABUTMENT WALL

SECTION C/B12


1'-0"
Finish Grade
Waterproofing (see Specs)
Filter Material
Filter Material Pay limits
Abutment
Structural Back Fill
4" tile drains. See abut. elevation for locations
Impervious material as selected by the Engineer. (Incidental to Struct. Excavation)
In case of excavation beyond the pay line, extend these sections of backfill materials to the extent of the excavated lines.
2'-0" Min.
Finish Grade
Rough Grade
Structural Backfill
1'-0"
1'-0"
Pay limits for Structural Excavation indicated by hatched area. All other excavation to be paid as roadway excavation. See Hwy. Drawing for limits.
Excavate & pour to neat lines
Pier Column
1'-0" Typ.
6" Typ.
1'-0"
1'-0"

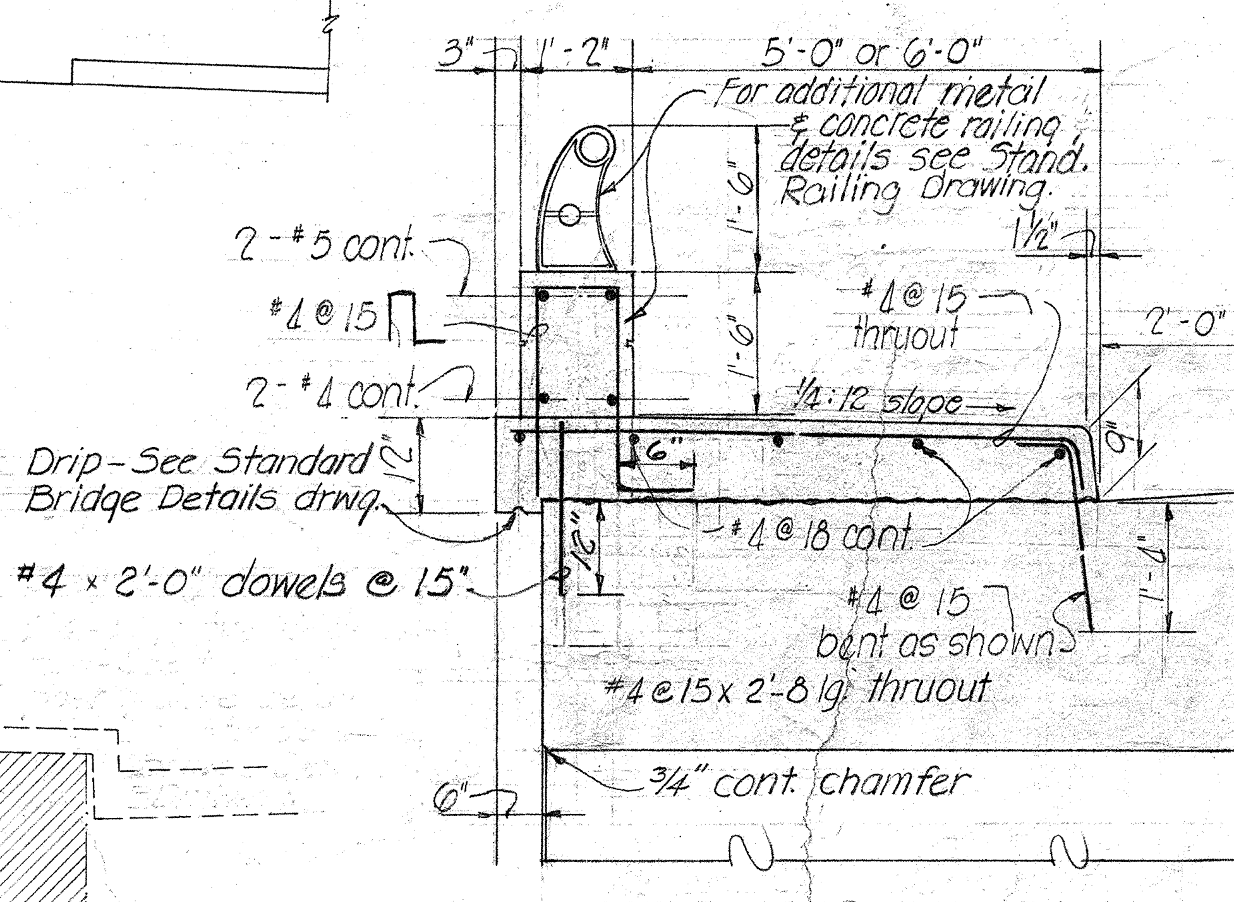
EXCAVATION AND BACKFILL DETAILS


℄ Pier Column, & Footing
Continuous ¾" Premoulded Jt. Filler all around
1½"
1'-2"
1½"
Cold Jt.
6-#11 Dowels
#55 Comp. Roofing paper (both ends)
Ref. top Ftg.
3"
3"

SECTION D/B12

SECTION E/B12

SHEET No. 173A
SUPERSEDES SHEET No. 173

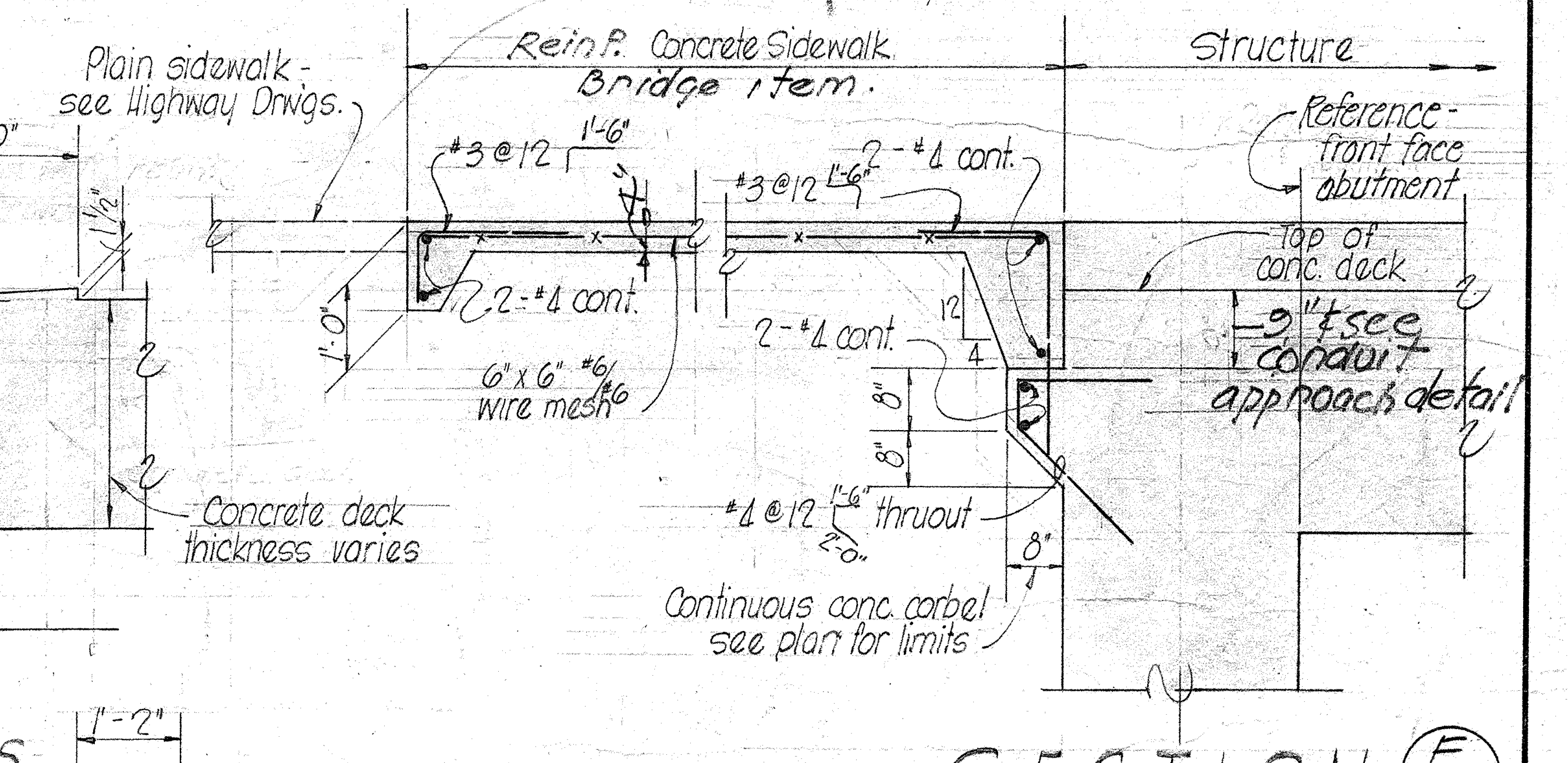

3"
1'-2"
5'-0" or 6'-0"
For additional metal & concrete railing details see Stand. Railing Drawing.
2-#5 cont.
#4 @ 15
2-#4 cont.
#4 @ 15 thruout
¼:12 slope
2'-0"
Drip - See Standard Bridge Details drwg.
#4 @ 18 cont.
#4 x 2'-0" dowels @ 15"
#4 @ 15 bent as shown
#4 @ 15 x 2'-8 lg. thruout
¾" cont. chamfer
Concrete deck thickness varies
6"

AT FLAT SLAB BRIDGE

TYPICAL SIDEWALK & RAILING DETAILS

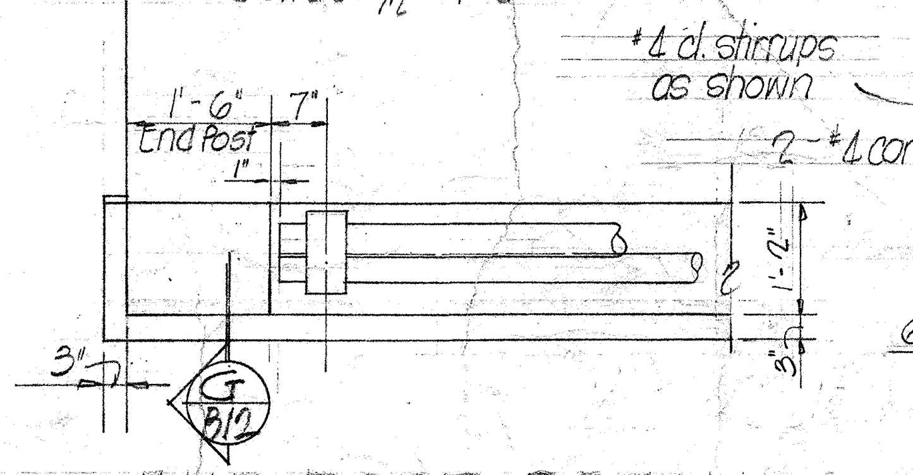
AT 6th, 7th & KOKO HEAD AVENUES ONLY

SCALE: ½" = 1'-0"


Plain sidewalk - see Highway Drwgs.
2'-0"
Reinf. Concrete Sidewalk Bridge item.
Structure
#3 @ 12
1'-6"
#3 @ 12
1'-6"
2-#4 cont.
2-#4 cont.
6"x6" #6/#6 wire mesh
2-#4 cont.
#4 @ 12 thruout
Reference - front face abutment
Top of conc. deck
3" - see conduit approach detail
Continuous conc. corbel see plan for limits

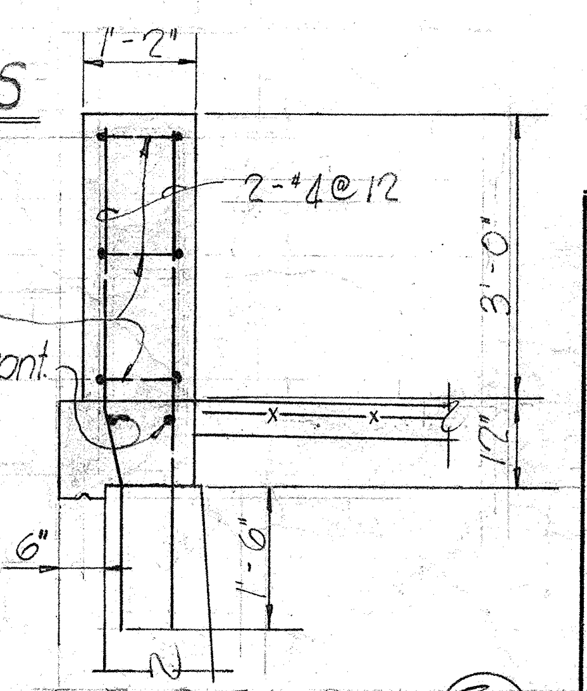
SECTION F/B12

SCALE: ½" = 1'-0"


1'-6"
7"
End Post
3"
G B12

END POST DETAIL

SCALE: ½" = 1'-0"


1'-2"
2-#4 @ 12
#4 cl. stirrups as shown
2-#4 cont.
3'-0"
12"
6"
1'-6"

SECTION G/B12

SCALE: ½" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DETAILS
6TH, 7TH, 10TH & KOKOHEAD
AVENUE SEPARATION

LUNALILO FREEWAY Proj. No. I-H1-1(4):24
FEB 1962

SHEET No. B12 OF SHEETS

173A

ORIGINAL PLAN	
	SURVEY PLOTTED BY
	DRAWN BY H. Mizomi W. Bailey
	TRACED BY
NOTE BOOK	DESIGNED BY C.R.Y. Y.C. G.K.
	QUANTITIES BY
No.	CHECKED BY P. Yamashita J.T.O.

DATE

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	174	217

PLAN - RETAINING WALL Nº "3-1B"

TYPE L-1

SCALE: 1" = 10'-0"

N
Reference - Front face of wall
Light Standard on top of wall - See Highway Lighting Drawing
℄ 18" sewer line
℄ Sta. 63+36.5±
6° 15'±
Radius
Outline - 18" sewer line & conc. jacket
Limits of ftg. cutoff wall & conc. jacket
15'-6"
E / R1
76'-7"
3" drip
Begin Wall Sta. 62+60
A / R1
Extend all far face reinf. Bend into bot. of ftg. thruout. Flare bars as required
D / R1
See Hwy Drawing
BL-57
63+00
64+00
Baseline ℄
65+00
Light Standard on top of wall - See Highway Lighting Drawings.
Reference - Front face of wall
3" drip
A / R1
76'-7"
EQ. P.T. Sta. 65+71.93
Sta. 65+71.22
End of Wall Sta. 65+81.29
Az. 298° 31' 30"

RETAINING WALL Nº "3-1B"

ESTIMATED QUANTITIES

ITEM	TOTALS	
Class A-1 Concrete	589	c.y.
Reinforcing Steel	39,178	lbs.
Filter Material	114	c.y.
Structural Exc.	835	c.y.

El. 61.00 Sta. 62+60
El. 73.00 Sta. 63+07
El. 78.00 Sta. 63+58
1'-0" Drip
El. 80.00 Sta. 64+30
El. 81.50
El. 71.50 Sta. 65+81.29
MK-6
MK-10
MK-16
MK-16
MK-19
MK-19
MK-19
MK-19
MK-19
MK-18
MK-18
MK-17
MK-17
MK-16
MK-10
Inv. El. 55.1±
4"φ Tile Drains @ 10'-0" o.c.
Top of Curb
El. 55.50
El. 56.00
El. 57.00
El. 58.00
El. 59.00
El. 60.00
El. 61.00
El. 62.00
El. 63.00
El. 64.00
El. 65.50
balance
19'-6"
38'-6"
29'-0"
29'-0"
38'-6"
29'-0"
29'-0"
19'-6"
29'-0"
25'-0"
15'-0"

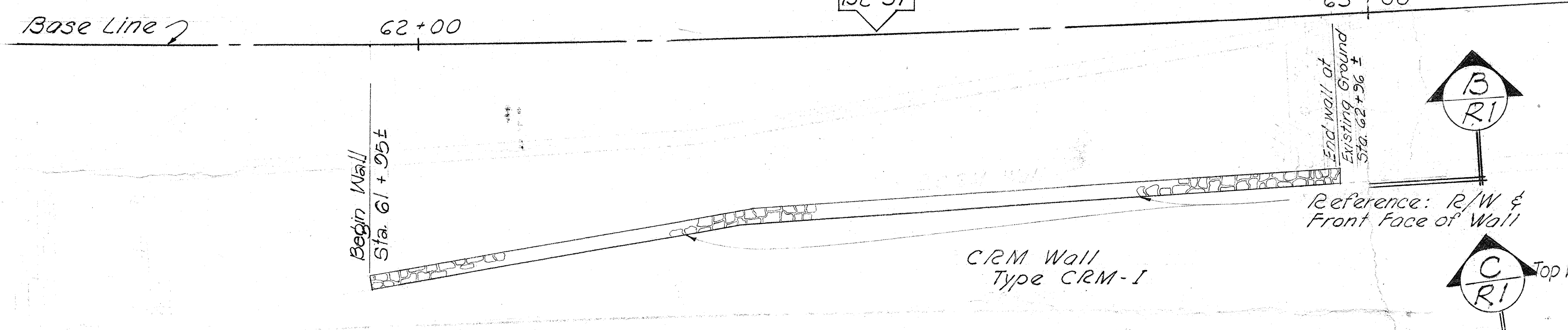
ELEVATION A/R1

SCALE: 1" = 10'

2'-0" Band. Special wall stem reinf. See det. below

Vert. stem reinf. Same size & spacing as MK-16. Stop bars at bot. of wall.

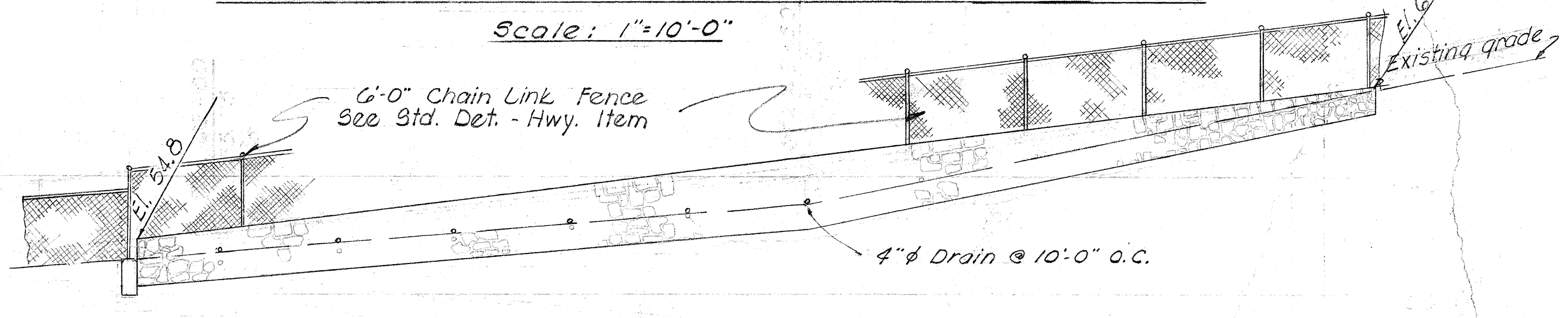
NOTE: Extend all horiz. reinf. thruout the entire wall. See Typical Retaining Wall Detail.



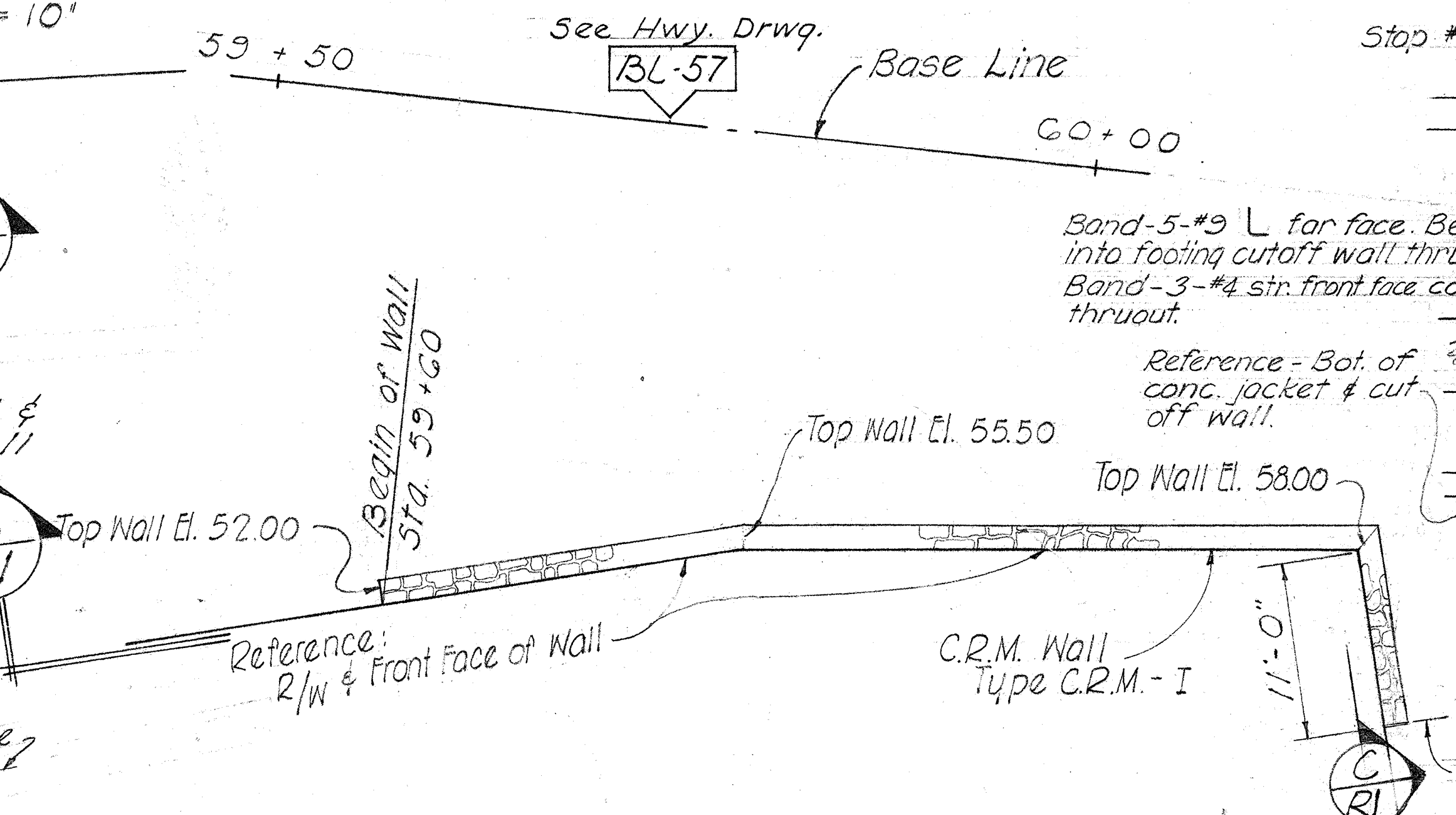
Base Line ℄
62+00
See Hwy. Drwg.
BL-57
63+00
Begin Wall Sta. 61+95±
End wall at Existing Ground Sta. 62+96±
B / R1
Reference: R/W & Front Face of Wall
CRM Wall Type CRM-I

PLAN - RETAINING WALL Nº "3-0B"

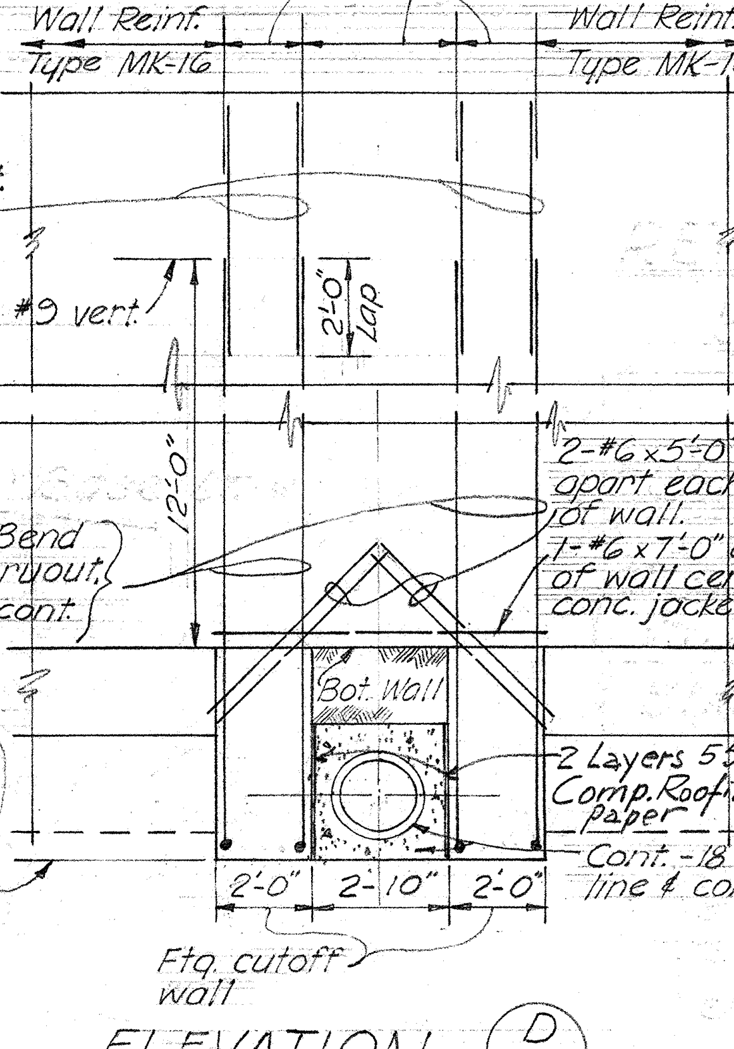
Scale: 1" = 10'-0"



6'-0" Chain Link Fence See Std. Det. - Hwy. Item
El. 54.8
El. 67.7
Existing grade
4"φ Drain @ 10'-0" O.C.
40



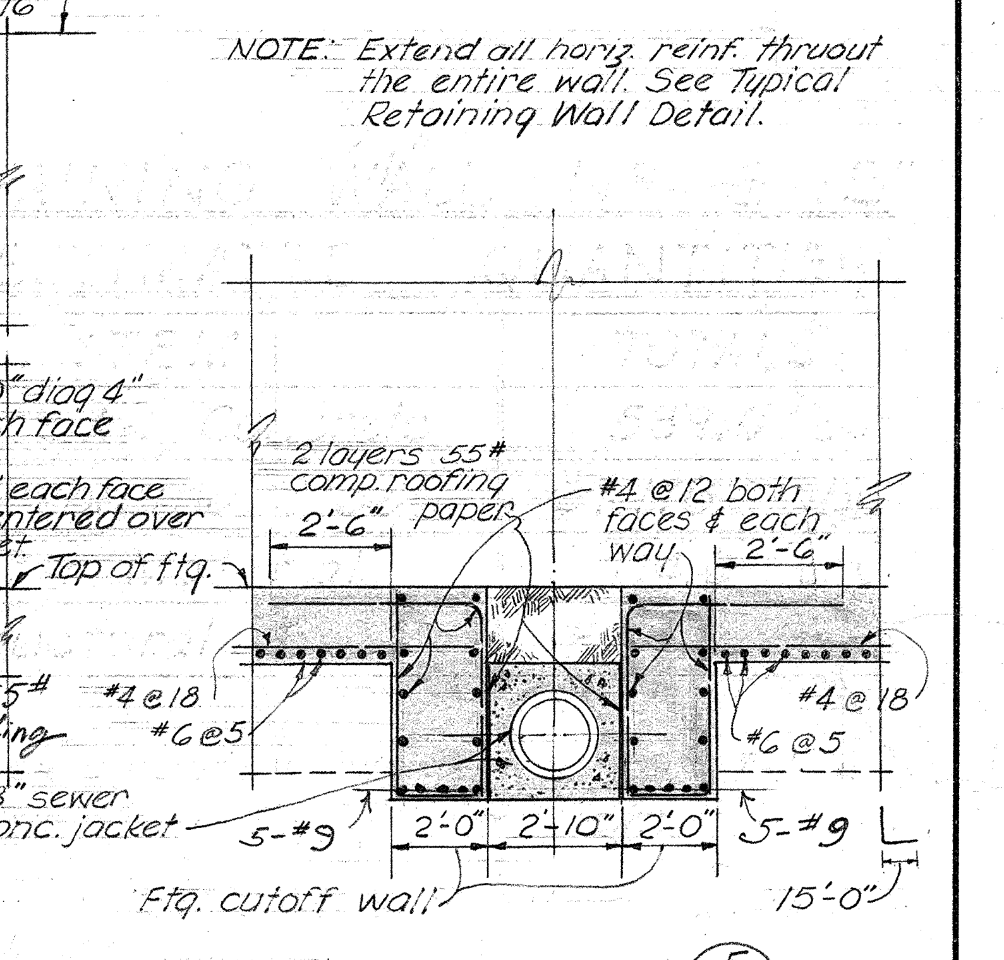
59+50
See Hwy. Drwg.
BL-57
Base Line
60+00
C / R1
Top Wall El. 52.00
Begin of Wall Sta. 59+60
Reference: R/W & Front Face of Wall
Top Wall El. 55.50
Top Wall El. 58.00
C.R.M. Wall Type C.R.M. - I
11'-0"
C / R1
Top Wall El. 51.00



Wall Reinf. Type MK-16
Wall Reinf. Type MK-16
Top of wall
Band-3-#5 Lap with #9 vert. far face
Stop #9 vert.
2'-0" Lap
12'-0"
2-#6 x 5'-0" diag 4" apart each face of wall.
1-#6 x 7'-0" each face of wall centered over conc. jacket
Band-5-#9 L far face. Bend into footing cutoff wall thruout. Band-3-#4 str. front face cont. thruout.
Reference - Bot. of conc. jacket & cut off wall.
Top of ftg.
Bot. Wall
2 Layers 55# Comp. Roofing Paper
Cont. - 18" sewer line & conc. jacket
2'-0"
2'-10"
2'-0"
Ftg. cutoff wall

ELEVATION D/R1

Scale: 1/4" = 1'-0"



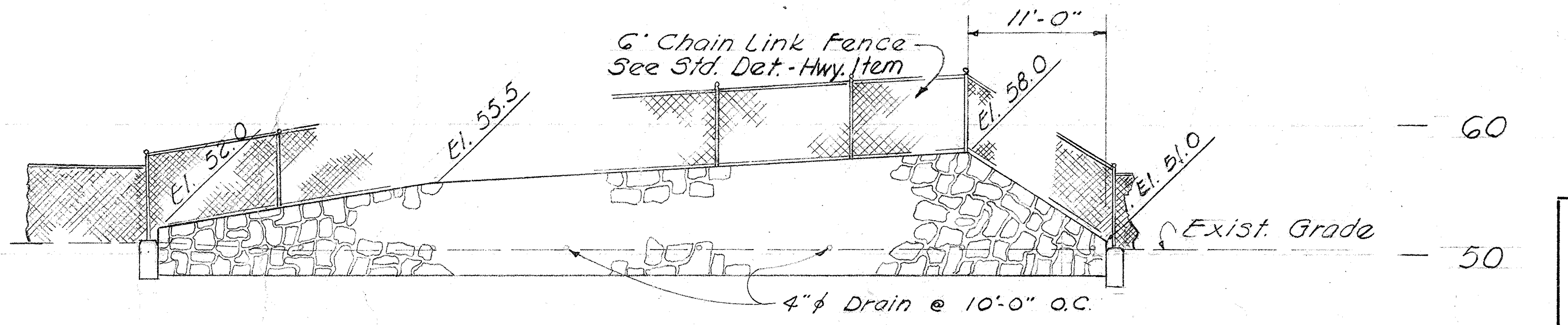
2 layers 55# comp. roofing paper
2'-6"
#4 @ 12 both faces & each way
2'-6"
#4 @ 18
#6 @ 5
#4 @ 18
#6 @ 5
5-#9
5-#9
2'-0"
2'-10"
2'-0"
Ftg. cutoff wall
15'-0"

SECTION E/R1

Scale 1/4" = 1'-0"

PLAN - RETAINING WALL Nº "2-0B"

Scale: 1" = 10'-0"



11'-0"
6' Chain Link Fence See Std. Det. - Hwy. Item
El. 52.0
El. 55.5
El. 58.0
El. 51.0
Exist. Grade
4"φ Drain @ 10'-0" O.C.
60
50
40

RETAINING WALL Nº "3-0B"

ESTIMATED QUANTITIES

ITEM	TOTALS	
C. R. M.	58	c.y.
Structural Exc.	55	c.y.
Filter Material	2	c.y.

ELEVATION B/R1

Scale: 1" = 10'-0"

RETAINING WALL Nº "2-0B"

ESTIMATED QUANTITIES

ITEM	TOTALS	
C. R. M.	52	c.y.
Structural Exc.	33	c.y.
Filter Material	2	c.y

DEVELOPED ELEVATION C/R1

Scale: 1" = 10'-0"

NOTE: For concrete retaining wall type L-1 reinforcing detail, refer to retaining wall standard sheet #179. For typical C.R.M. wall detail, refer to sheet #179

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALLS
Nº's "2-0B", "3-1B" & "3-0B"

LUNALILO FREEWAY Proj. No. I-HI-1(4):24
SEPTEMBER 1962

SHEET No. R1 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY ____ DATE ____
	DRAWN BY J. Fukui "
	TRACED BY "
NOTE BOOK	DESIGNED BY T.M. "
	QUANTITIES BY J.F. W.B. "
No.____	CHECKED BY P. YAMASHITA J.T.O. "

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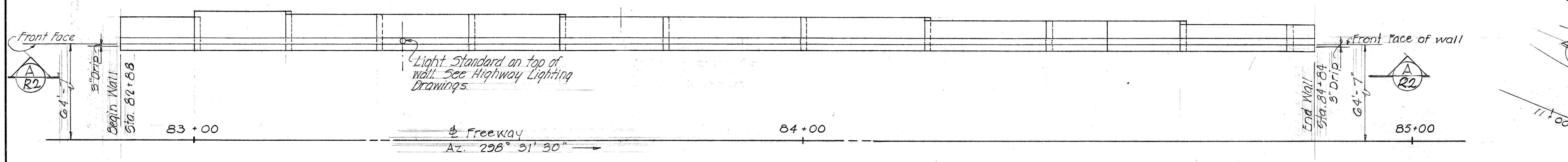
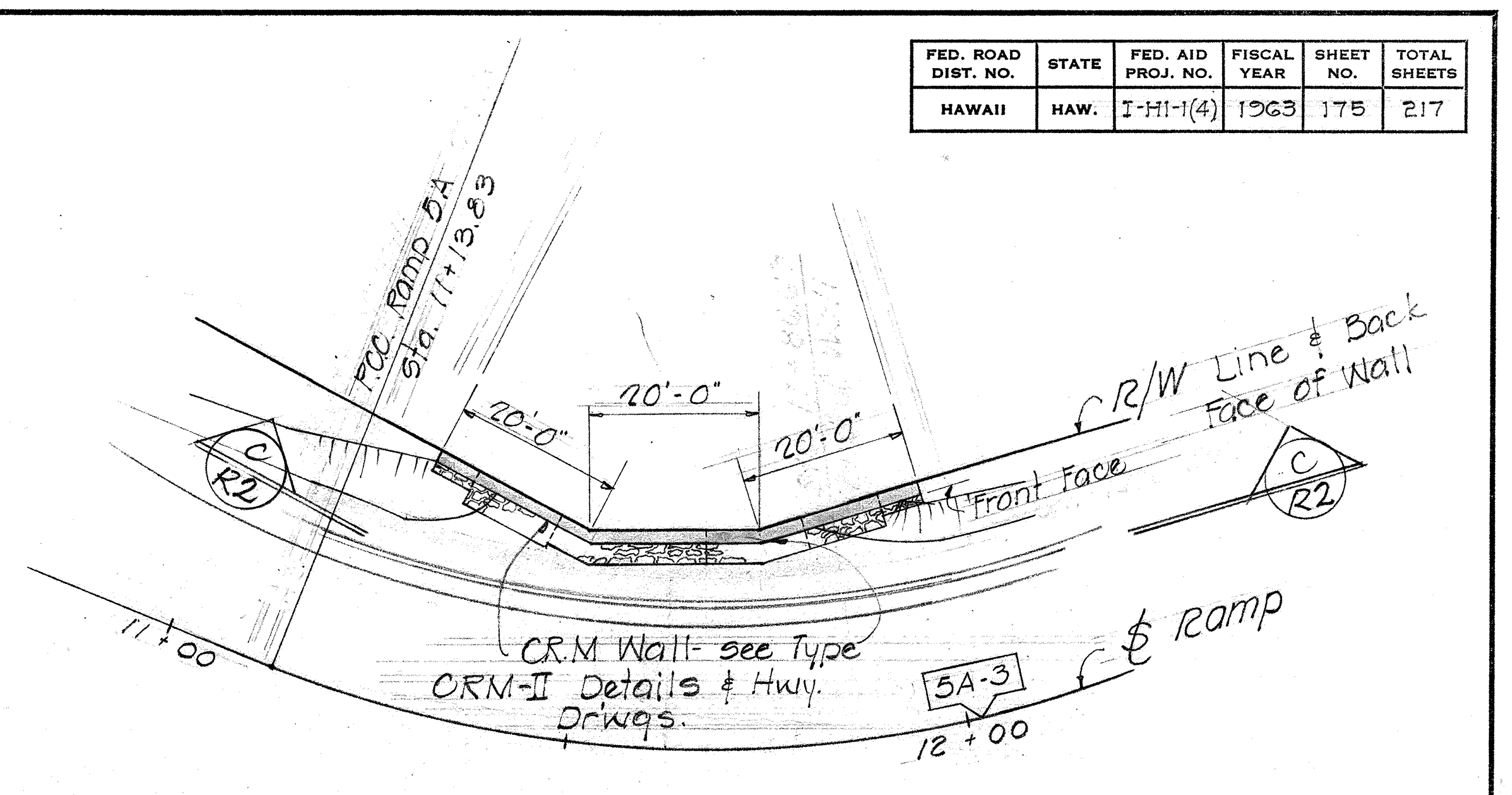
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	175	217



Front Face
3" Drip
Begin Wall Sta. 82+88
64'-7"
Light Standard on top of wall. See Highway Lighting Drawings.
83+00
℄ Freeway
Az. 298° 31' 30"
84+00
Front Face of wall
End Wall Sta. 84+84
3" Drip
64'-7"
85+00
A R2

LAYOUT PLAN - RETAINING WALL N° "7-1B" Scale: 1" = 10'-0"

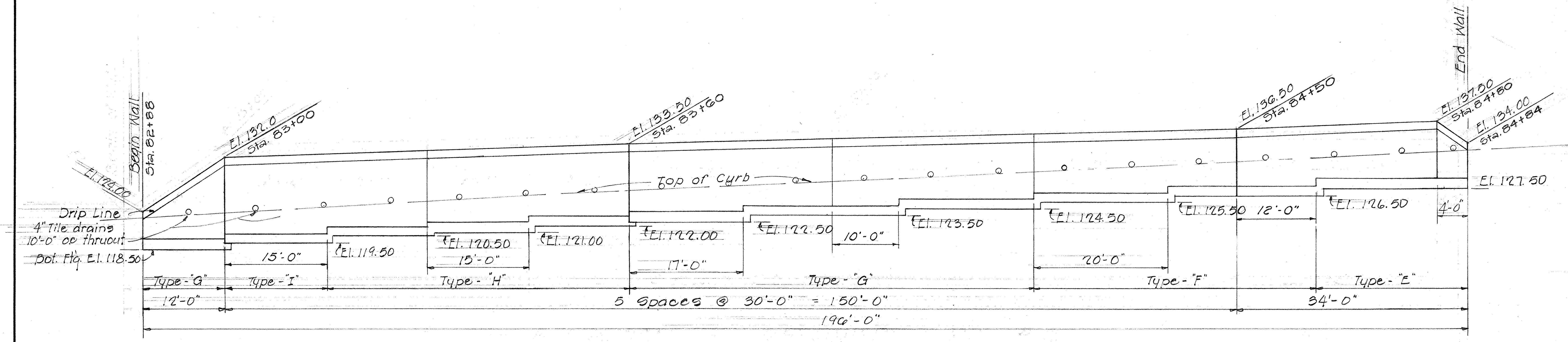
TYPE (FOOTING ON ROCK) SEE SCHEDULE



P.C. Ramp 5A Sta. 11+13.83
20'-0"
20'-0"
20'-0"
R/W Line & Back Face of Wall
Front Face
C R2
11+00
C.R.M. Wall - See Type CRM-II Details & Hwy. Drwgs.
℄ Ramp
54-3
12+00

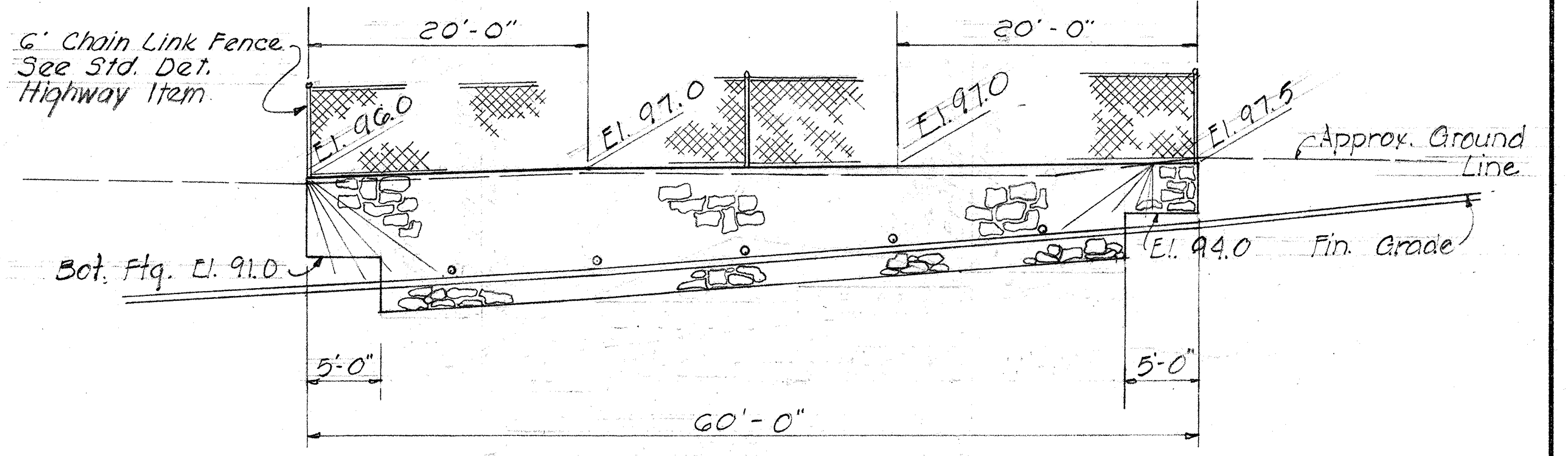
LAYOUT PLAN - RETAINING WALL N° "5-A"

Scale: 1" = 20'-0"



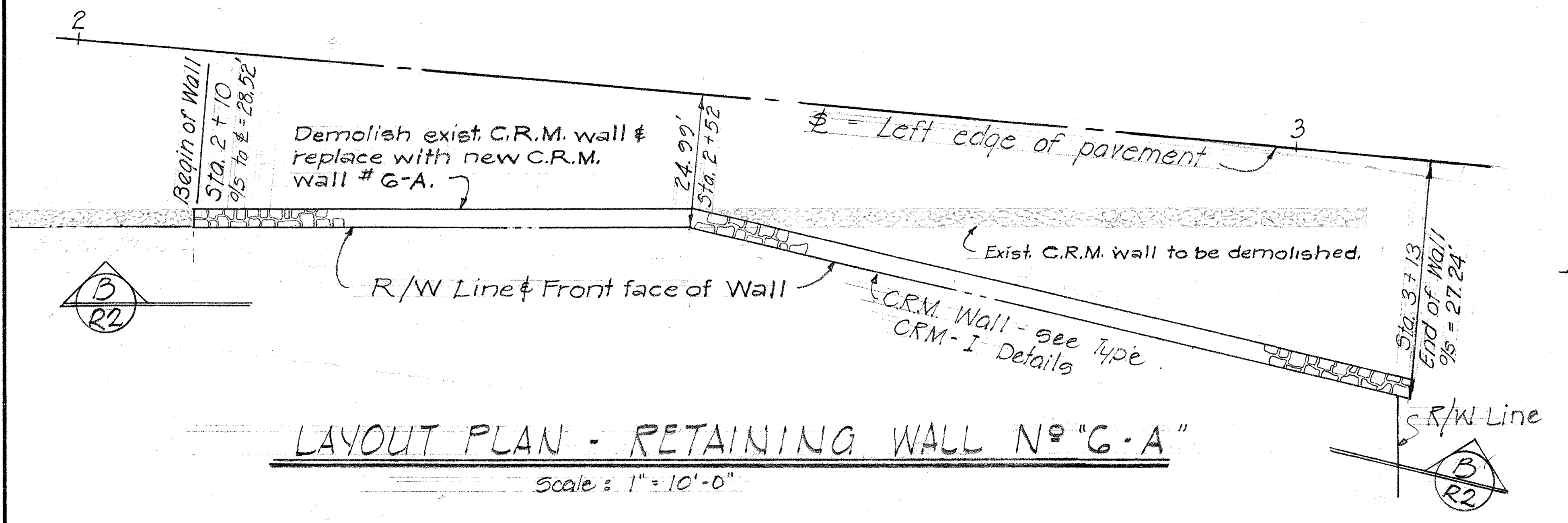
Begin Wall Sta. 82+88
El. 132.0 Sta. 83+00
El. 128.00
Drip Line
4" Tile drains 10'-0" op. thruout
Bot. Ftg. El. 118.50
El. 133.50 Sta. 83+60
Top of Curb
El. 119.50
El. 120.50
El. 121.00
El. 122.00
El. 122.50
El. 123.50
El. 124.50
El. 125.50
El. 126.50
El. 136.50 Sta. 84+50
El. 137.00 Sta. 84+80
End Wall
El. 134.00 Sta. 84+84
El. 127.50
15'-0"
15'-0"
17'-0"
10'-0"
20'-0"
12'-0"
4'-0"
Type - "G"
Type - "I"
Type - "H"
Type - "G"
Type - "F"
Type - "E"
12'-0"
5 Spaces @ 30'-0" = 150'-0"
34'-0"
196'-0"

ELEVATION A/R2



6' Chain Link Fence See Std. Det. Highway Item
20'-0"
20'-0"
El. 96.0
El. 97.0
El. 97.0
El. 97.5
Approx. Ground Line
Bot. Ftg. El. 91.0
El. 94.0
Fin. Grade
5'-0"
5'-0"
60'-0"

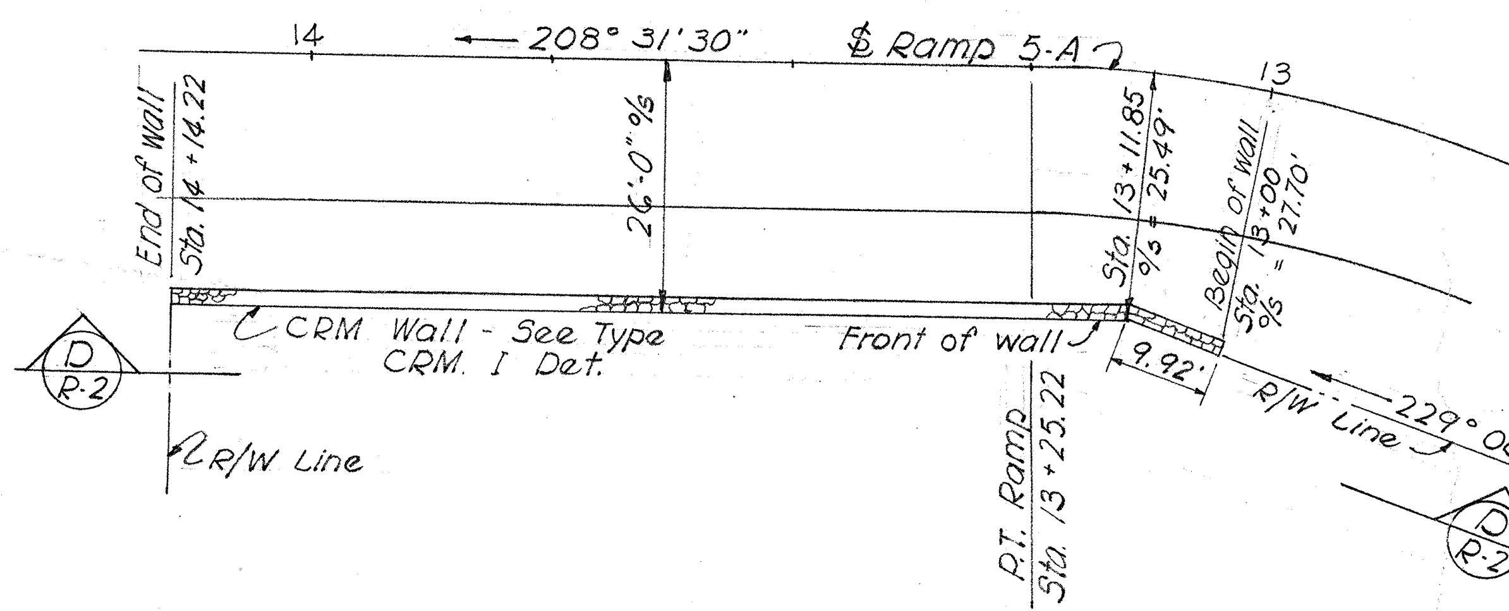
DEVELOPED ELEVATION C/R2



2
Begin of Wall Sta. 2+10 9/5 to ℄ = 28.52'
Demolish exist. C.R.M. wall & replace with new C.R.M. wall # 6-A.
24.92' Sta. 2+52
℄ = Left edge of pavement
3
Exist. C.R.M. wall to be demolished.
R/W Line & Front face of Wall
C.R.M. Wall - See Type CRM-I Details
Sta. 3+13 End of Wall 9/5 = 27.24'
R/W Line
B R2

LAYOUT PLAN - RETAINING WALL N° "6-A"

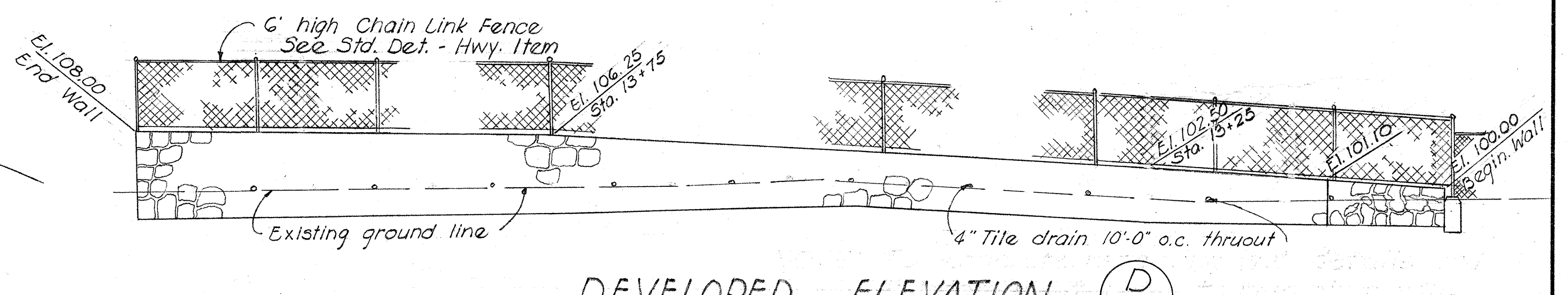
Scale: 1" = 10'-0"



14
208° 31' 30"
℄ Ramp 5-A
13
End of Wall Sta. 14+14.22
26'-0" 9/5
Sta. 13+11.85 9/5 25.49'
Begin of Wall Sta. 13+00 9/5 = 27.70'
C.R.M. Wall - See Type CRM. I Det.
Front of wall
9.92'
R/W Line
229° 00' 00"
R/W Line
P.T. Ramp Sta. 13+25.22
D R2

LAYOUT PLAN - RETAINING WALL N° "5-B"

Scale: 1" = 20'-0"



El. 108.00 End Wall
6' high Chain Link Fence See Std. Det. - Hwy. Item
El. 106.25 Sta. 13+75
El. 102.50 Sta. 13+25
El. 101.10
100.00 Begin Wall
Existing ground line
4" Tile drain 10'-0" o.c. thruout

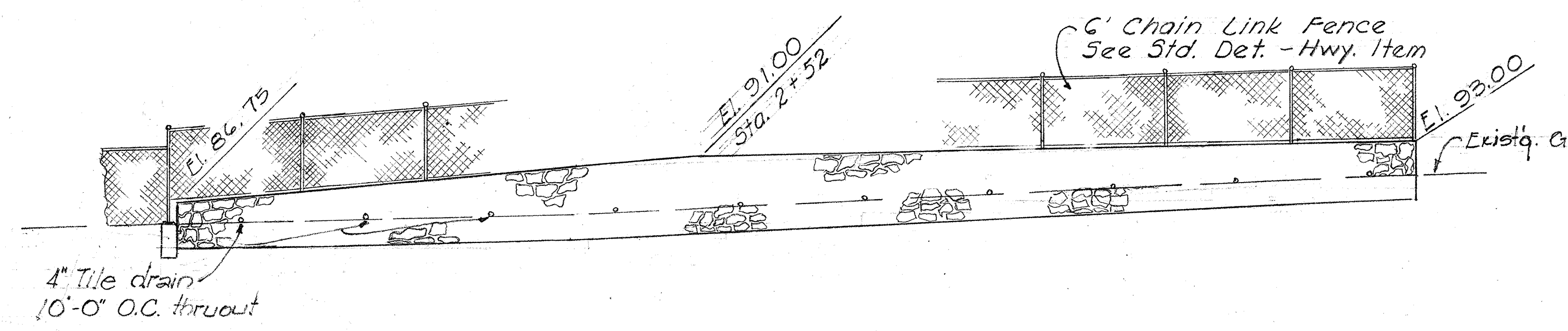
DEVELOPED ELEVATION D/R2

Scale: 1" = 10'-0"

NOTE:

For concrete retaining walls and reinforcement, refer to retaining wall standard sheet # 180.

For typical C.R.M. wall details, refer to sheet # 179.



El. 86.75
El. 91.00 Sta. 2+52
6' Chain Link Fence See Std. Det. - Hwy. Item
El. 93.00
Exist. Ground Line
4" Tile drain 10'-0" O.C. thruout

DEVELOPED ELEVATION B/R2

ESTIMATED QUANTITIES

ITEM	RETAINING WALL N° "5-A"	RETAINING WALL N° "5-B"	RETAINING WALL N° "6-A"	RETAINING WALL N° "7-1B"
Class A-1 Concrete				132 c.y.
Reinforcing Steel				8,466 lbs.
Filter Material	2 c.y.	3 c.y.	3 c.y.	36 c.y.
C.R.M.	44 c.y.	51 c.y.	41 c.y.	
Structural Exc.	27 c.y.	49 c.y.	37 c.y.	334 c.y.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALLS
N°'s "5-A", "5-B", "6-A" & "7-1B"

LUNALILO FRWY. Proj No. I-H1-1(4):24
1962

SHEET No. R2 OF SHEETS

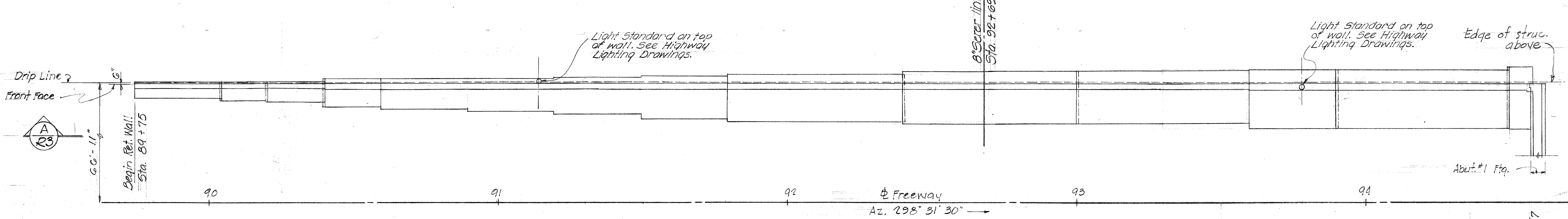
ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY
DRAWN BY Fukui
TRACED BY
DESIGNED BY T.M.
QUANTITIES BY W.F. W.B.
CHECKED BY P. Yamashita J.I.O.
DATE

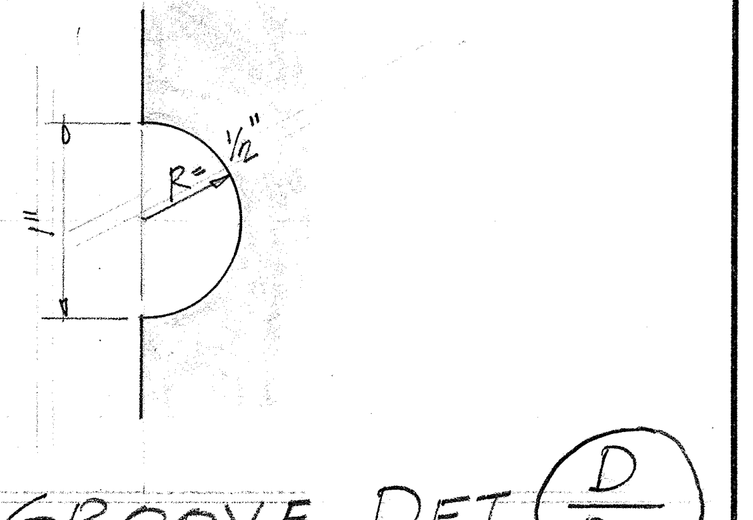
PRINTED ON CLEARPRINT 1000-H

175

Revision No. 1 - App ½" Horiz. Groove in Ret. Wall
Date: 11/4/63

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	176	217


Drip Line
Front Face
6"
66'-11"
A R3
Begin Ret. Wall Sta. 89+75
Light Standard on top of wall. See Highway Lighting Drawings.
8" Sewer line Sta. 92+69.00
Light Standard on top of wall. See Highway Lighting Drawings.
Edge of struc. above
Abut. #1 Ftg.
90
91
92
℄ Freeway
Az. 298° 31' 30"
93
94



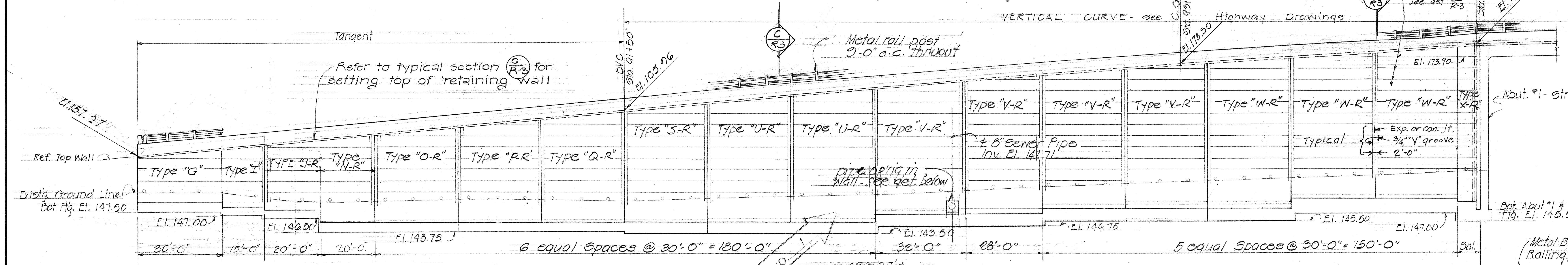
½ ¢ GROOVE DET. (D/R-3)

LAYOUT PLAN RETAINING WALL No "9-1B"

Scale: 1" = 20'-0"

TYPE (FOOTING ON ROCK) SEE SCHEDULE

REVISION NO. 1

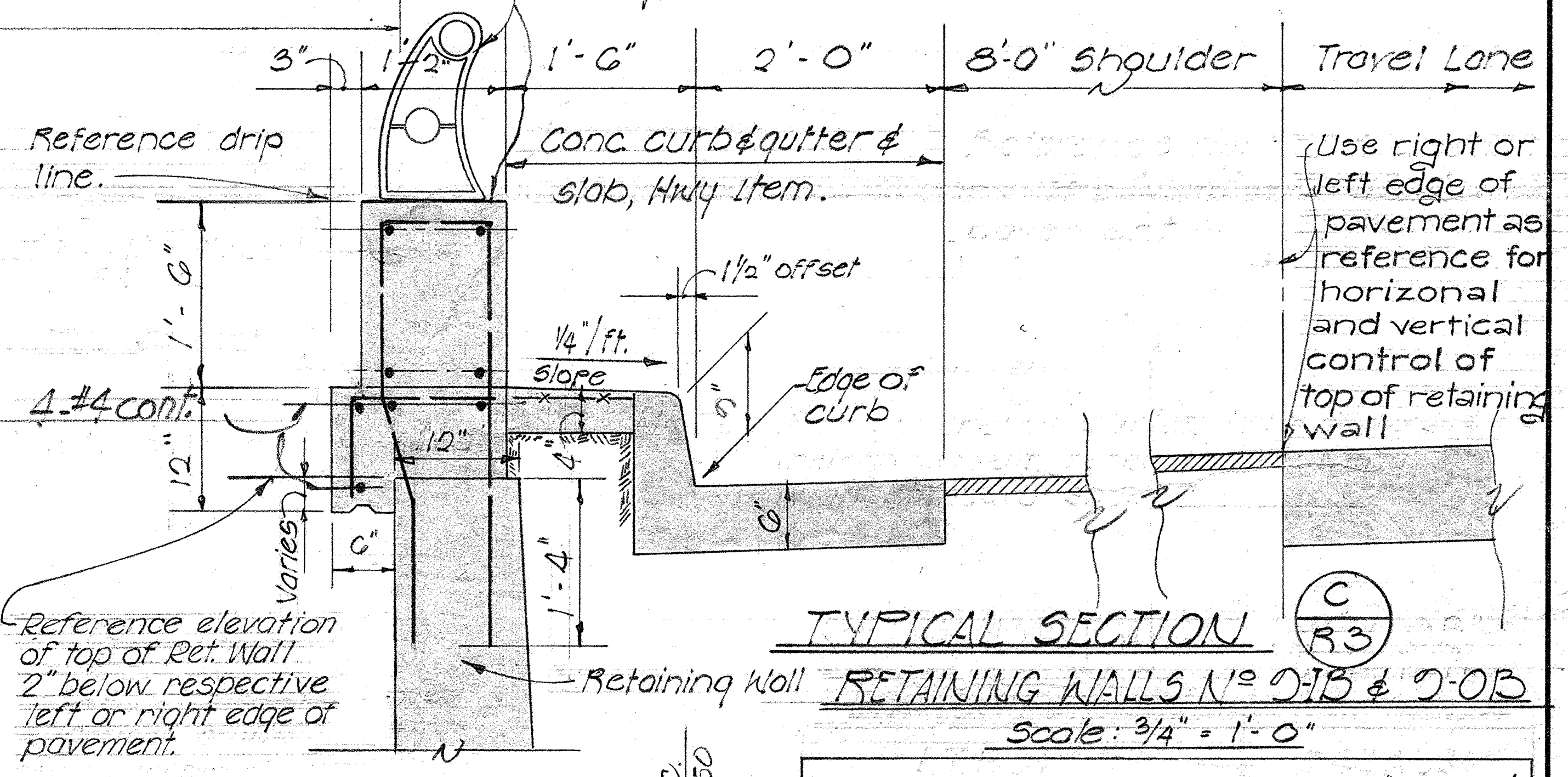

VERTICAL CURVE - see Highway Drawings
E.V.C. Sta. 95+50
Tangent
Refer to typical section (C/R-3) for setting top of retaining wall
Metal rail post 9'-0" o.c. throuout
C R3
B.V.C. Sta. 91+50
El. 165.06
C.G. Sta. 93+50
El. 173.90
½ ¢ grooves @ 2' c/c See det D/R-3
Sta. 94+58.27
El. 176.56
El. 157.27
Ref. Top Wall
Existg. Ground Line
Bot. Ftg. El. 147.50
Type "G"
Type "I"
TYPE "J-R"
Type "N-R"
Type "O-R"
Type "P-R"
Type "Q-R"
Type "S-R"
Type "U-R"
Type "U-R"
Type "V-R"
Type "V-R"
Type "V-R"
Type "V-R"
Type "W-R"
Type "W-R"
Type "W-R"
Type "X-R"
El. 173.90
Abut. #1 - Struct. #10
Typical
Exp. or con. jt.
¾" "V" groove
2'-0"
℄ 8" Sewer Pipe Inv. El. 147.71
Pipe op'ng in Wall - see det. below
Bot. Abut. #1 & Ret. Wall Ftg. El. 145.50
El. 147.00
El. 146.50
El. 143.75
El. 143.50
El. 144.75
El. 145.50
El. 147.00
30'-0"
15'-0"
20'-0"
20'-0"
6 equal Spaces @ 30'-0" = 180'-0"
32'-0"
28'-0"
5 equal Spaces @ 30'-0" = 150'-0"
Bal.
483.27' ±
REVISION NO. 1

ELEVATION (A/R3)

Scale: Vert. 1" = 10'-0" - Horiz. 1" = 20'-0"

RETAINING WALL No "9-1B" ESTIMATED QUANTITIES

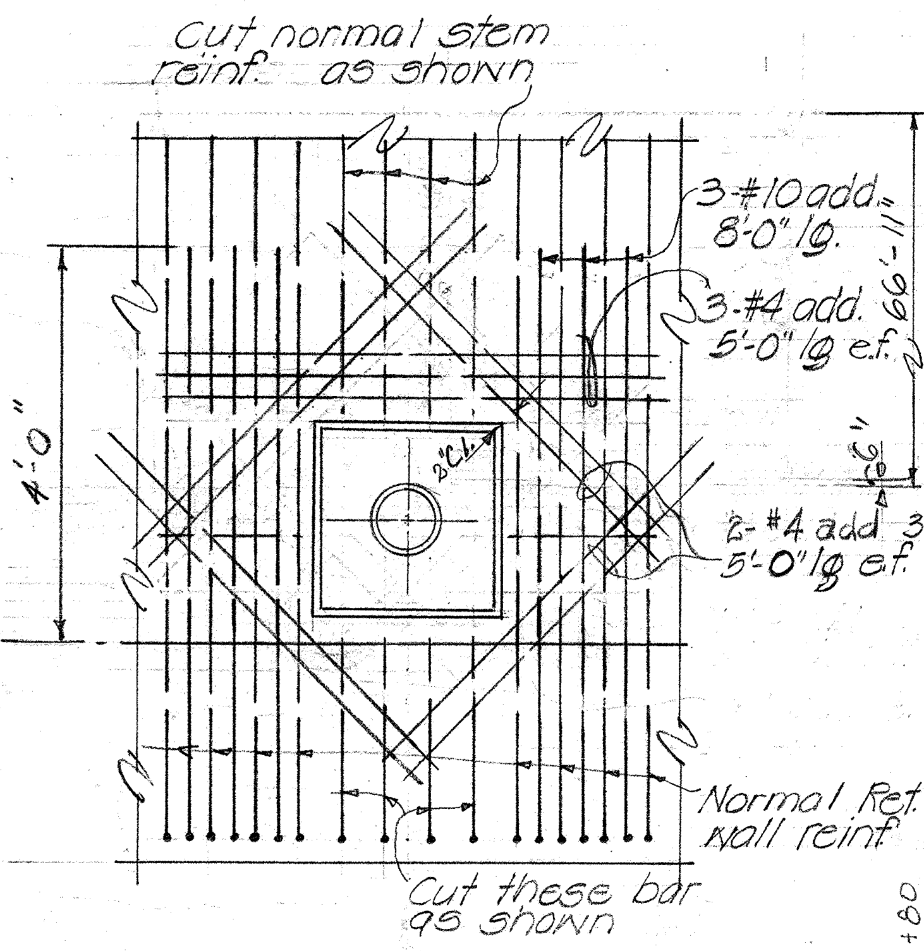
ITEM	TOTALS
Class A-1 Concrete	1,074 c.y
Reinforcing Steel	132,316 lbs.
Filter Material	304 c.y.
Structural Exc.	1,324 c.y.
Metal Bridge Railing	482 Lin. Ft.
Concrete Railing	484 Lin. Ft.


Metal Bridge Railing & Concrete Railing, see Standard Details.
3"
1'-2"
1'-6"
2'-0"
8'-0" Shoulder
Travel Lane
Reference drip line.
Conc. curb & gutter & slab, Hwy Item.
Use right or left edge of pavement as reference for horizonal and vertical control of top of retaining wall
1½" offset
¼"/ft. slope
Edge of curb
1'-6"
4-#4 cont.
12"
12"
6"
6"
6"
Varies
6"
1'-4"
Reference elevation of top of Ret. Wall 2" below respective left or right edge of pavement.
Retaining Wall

TYPICAL SECTION (C/R3)

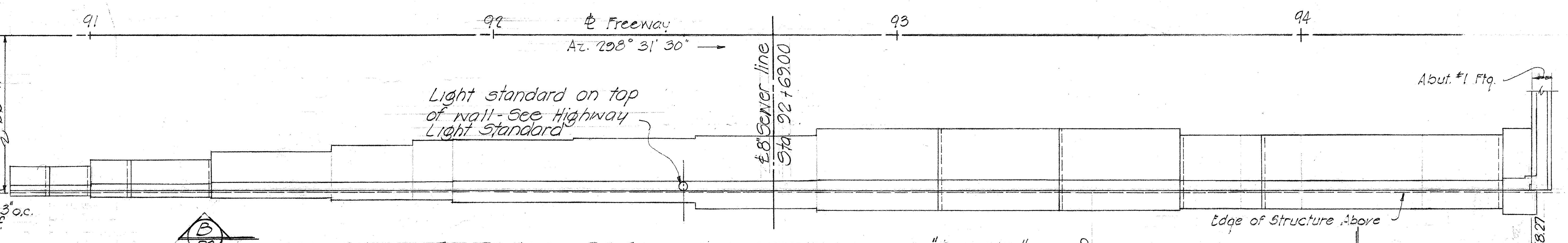
RETAINING WALLS No 9-1B & 9-0B

Scale: ¾" = 1'-0"


Cut normal stem reinf. as shown
3-#10 add. 8'-0" lg.
3-#4 add. 5'-0" lg e.f.
2-#4 add 3" o.c. 5'-0" lg e.f.
2" Cl.
4'-0"
Normal Ret. wall reinf.
Cut these bar as shown

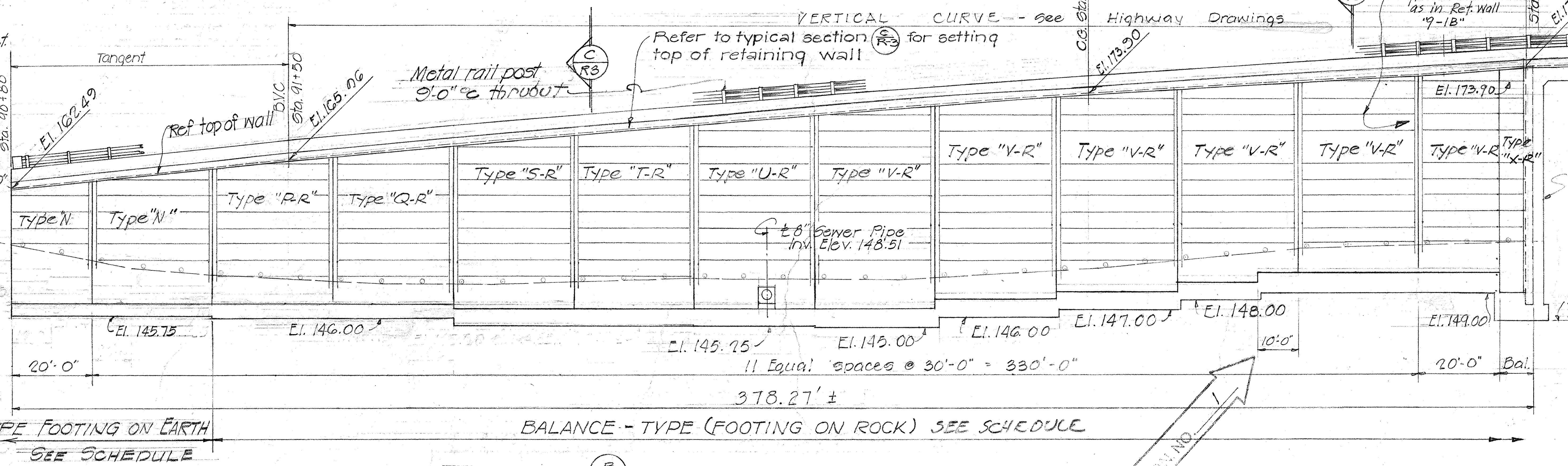
TYP. ELEV. - REINF. PIPE OPENING

Scale: ½" = 1'-0"


91
92
℄ Freeway
Az. 298° 31' 30"
93
94
Light standard on top of wall - See Highway Light Standard
℄ 8" Sewer line Sta. 92+69.00
6"
66'-11"
B R3
Abut. #1 Ftg.
Edge of Structure Above

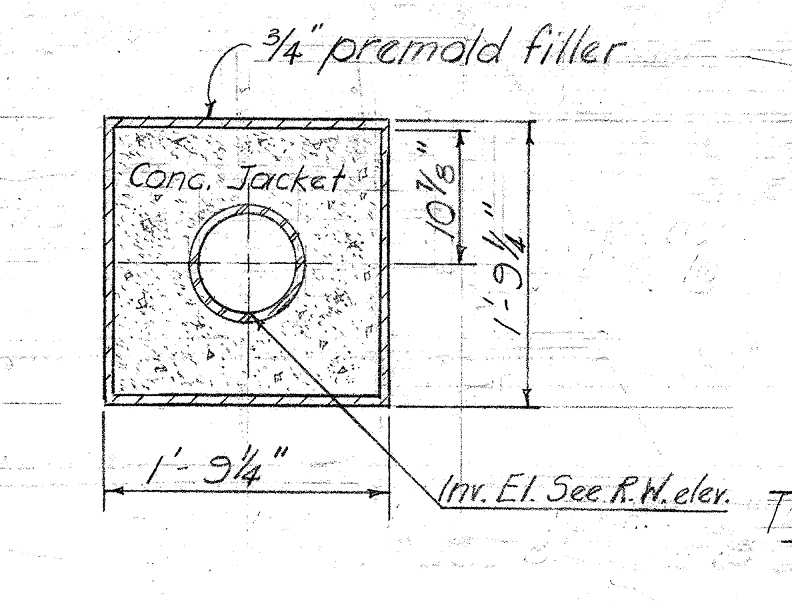
LAYOUT PLAN RETAINING WALL No "9-0B"

Scale: 1" = 20'


VERTICAL CURVE - See Highway Drawings
Tangent
Refer to typical section (C/R-3) for setting top of retaining wall
Metal rail post 9'-0" c.c. throuout
C R3
C R3
Sta. 90+80
El. 162.49
Ref top of wall
B.V.C. Sta. 91+50
El. 165.06
C.G. Sta. 93+50
El. 173.90
Hor. & Vert. grooves same as in Ret. Wall "9-1B"
Sta. 94+58.27
El. 176.56
El. 173.90
Type "N"
Type "N"
Type "P-R"
Type "Q-R"
Type "S-R"
Type "T-R"
Type "U-R"
Type "V-R"
Type "V-R"
Type "V-R"
Type "V-R"
Type "V-R"
Type "V-R"
Type "X-R"
Abut. #1 - Struct. #10
℄ 8" Sewer Pipe Inv. Elev. 148.51
Bot. Abut. #1 & Ret. Wall Ftg. El. 145.50
El. 145.75
El. 146.00
El. 145.25
El. 145.00
El. 146.00
El. 147.00
El. 148.00
El. 149.00
10'-0"
20'-0"
11 Equal spaces @ 30'-0" = 330'-0"
20'-0"
Bal.
378.27' ±
TYPE FOOTING ON EARTH SEE SCHEDULE
BALANCE - TYPE (FOOTING ON ROCK) SEE SCHEDULE
REVISION NO. 1

ELEVATION (B/R3)

Scale: Vert. 1" = 10'-0" - Horiz. 1" = 20'-0"


¾" premold filler
Conc. Jacket
10⅞"
1'-9¼"
1'-9¼"
Inv. El. See R.W. elev.

TYP. PIPE OPEN'G DET

Scale: ¾" = 1'-0"

RETAINING WALL No "9-0B" ESTIMATED QUANTITIES

ITEM	TOTALS
Class A-1 Concrete	851 c.y
Reinforcing Steel	107,365 lbs
Filter Material	251 c.y.
Structural Exc.	909 c.y.
Metal Bridge Railing	377 Lin. Ft.
Concrete Railing	379 Lin. Ft.

NOTE:
For concrete retaining wall details & reinforcement, refer to retaining wall standard sheet #180

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALLS
Nos "9-1B", "9-0B"

LUNALILO FREEWAY Proj. No. I-H1-1(4):24

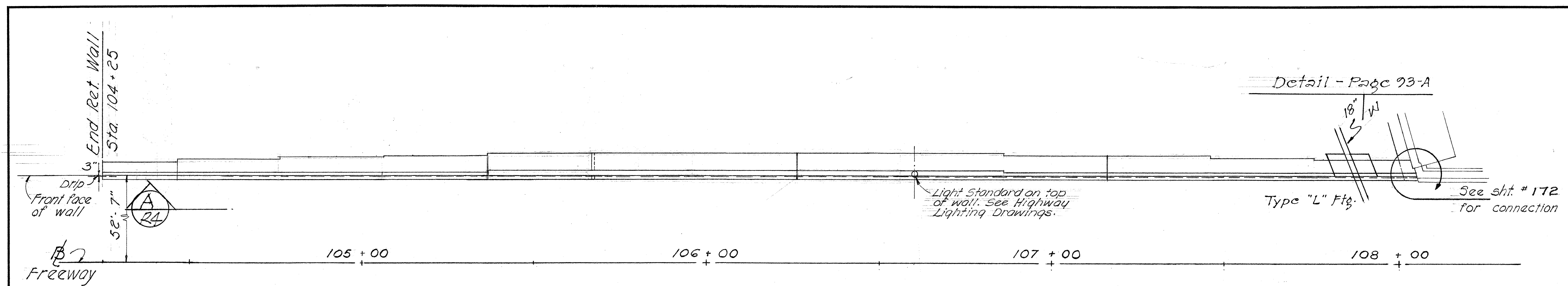
JUNE 1962

SHEET No. R3 OF SHEETS

ORIGINAL PLAN	
	SURVEY PLOTTED BY ___ DATE ___
	DRAWN BY W. Bailey "
	TRACED BY "
NOTE BOOK	DESIGNED BY T.M. "
	QUANTITIES BY W.B. S.Y. "
No.	CHECKED BY P. YAMASHITA J.T.O. "

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	177	217


End Ret. Wall
Sta. 104+25
3"
Drip
Front face of wall
52'-7"
A
R4
℄ Freeway
105+00
106+00
107+00
108+00
Light Standard on top of wall. See Highway Lighting Drawings.
Detail - Page 93-A
18"
W
Type "L" Ftg.
See sht. # 172 for connection

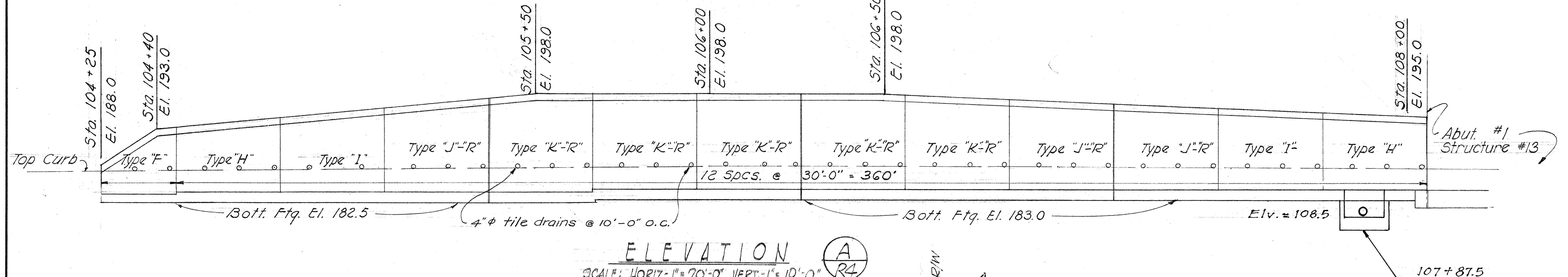
LAYOUT PLAN – RETAINING WALL Nº "12-1B" Scale: 1" = 20'-0"

TYPE (FOOTING ON ROCK) SEE SCHEDULE

RETAINING WALL Nº "12-1B"

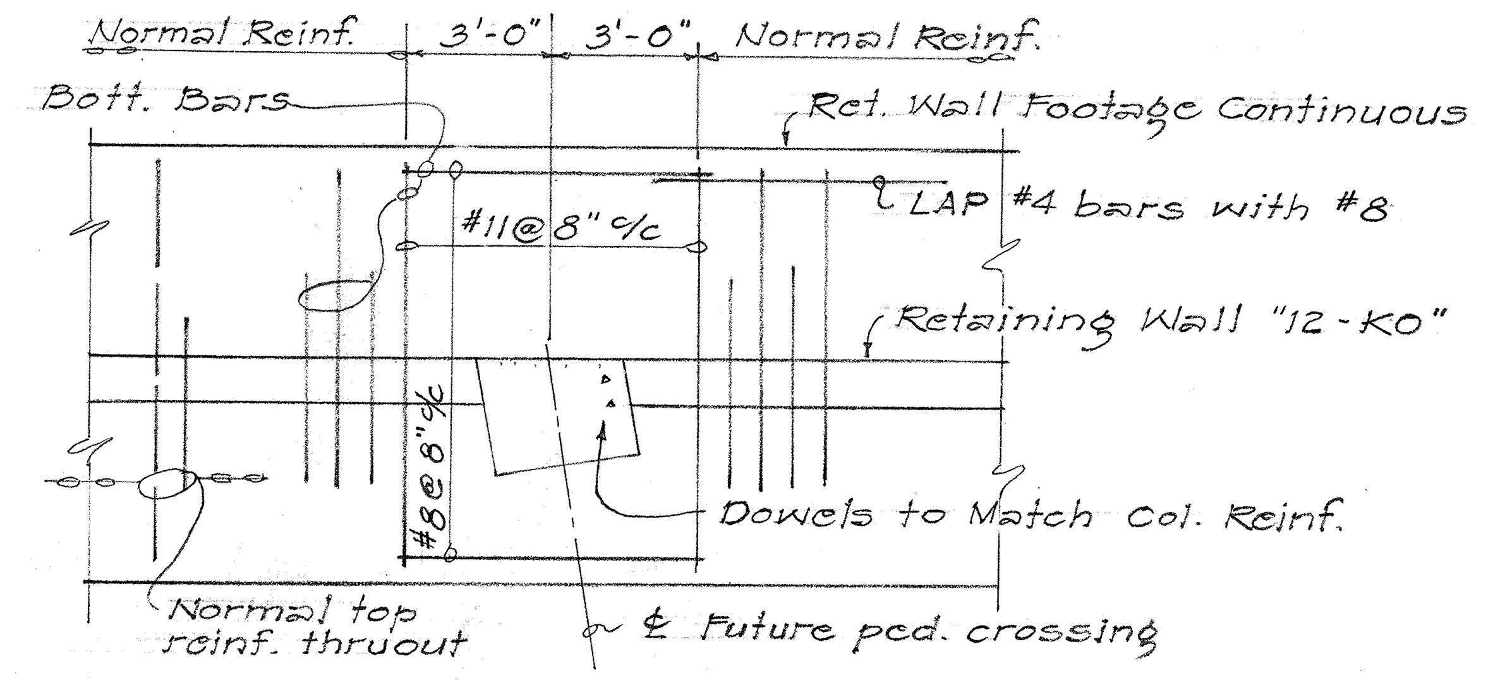
ESTIMATED QUANTITIES

ITEM	TOTALS	
Class A-1 Concrete	343	c.y.
Reinforcing Steel	24,777	lbs.
Filter Material	107	c.y.
Structural Exc.	724	c.y.


Sta. 104+25
El. 188.0
Sta. 104+40
El. 193.0
Sta. 105+50
El. 198.0
Sta. 106+00
El. 198.0
Sta. 106+50
El. 198.0
Sta. 108+00
El. 195.0
Top Curb
Type "F"
Type "H"
Type "I"
Type "J"-"R"
Type "K"-"R"
Type "K"-"R"
Type "K"-"R"
Type "K"-"R"
Type "K"-"R"
Type "J"-"R"
Type "J"-"R"
Type "I"
Type "H"
12 Spcs. @ 30'-0" = 360'
Abut. #1
Structure #13
Bott. Ftg. El. 182.5
4"ɸ tile drains @ 10'-0" o.c.
Bott. Ftg. El. 183.0
Elv. = 108.5
107+87.5
Type "L"

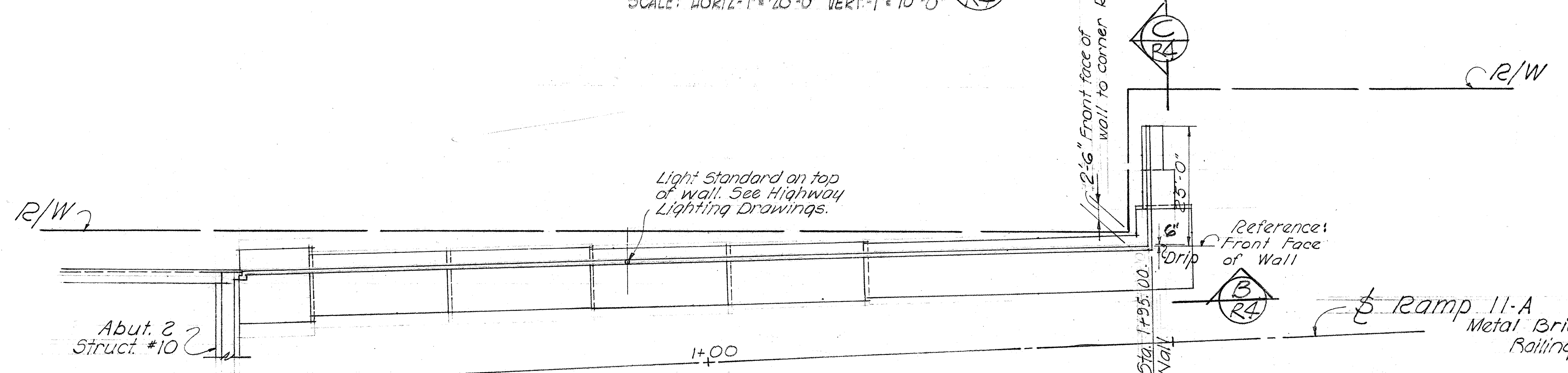
ELEVATION (A/R4)

SCALE: HORIZ - 1" = 20'-0" VERT. - 1" = 10'-0"


Normal Reinf.
3'-0"
3'-0"
Normal Reinf.
Bott. Bars
Ret. Wall Footage Continuous
LAP #4 bars with #8
#11 @ 8" c/c
Retaining Wall "12-KO"
#8 @ 8" c/c
Dowels to Match Col. Reinf.
Normal top reinf. thruout
℄ Future ped. crossing

PLAN-RETAING WALL FOOT'G REINF. AT COLUMN Nº. 20 – RETAINING WALL Nº. "12-KO"

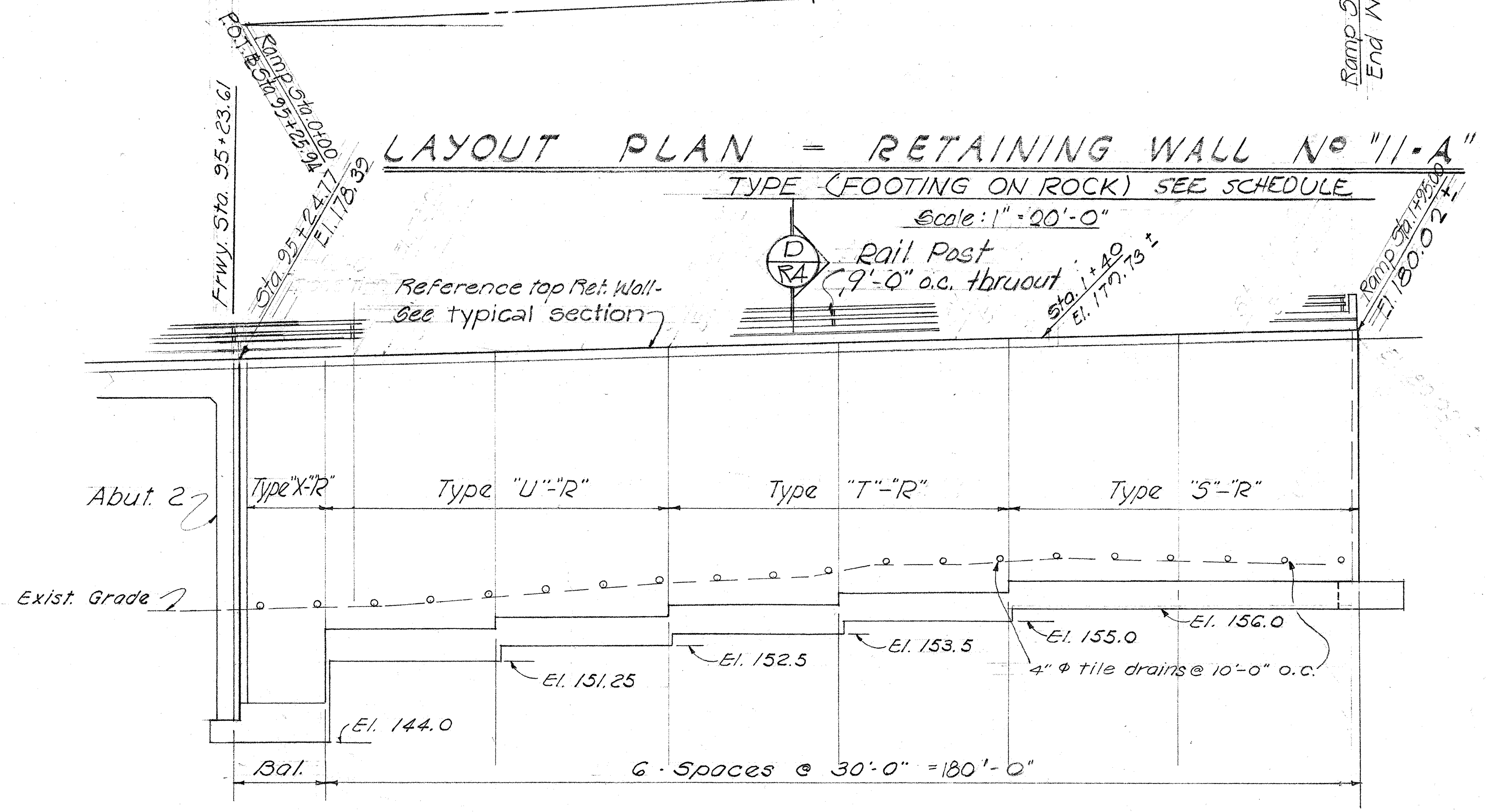
"AS BUILT"


C
R4
2'-6" Front face of wall to corner R/W
R/W
R/W
Light Standard on top of wall. See Highway Lighting Drawings.
3'-0"
6"
Drip
Reference: Front Face of Wall
B
R4
Abut. 2
Struct. #10
1+00
Ramp Sta. 1+95.00
End Wall
℄ Ramp 11-A

LAYOUT PLAN – RETAINING WALL Nº "11-A"

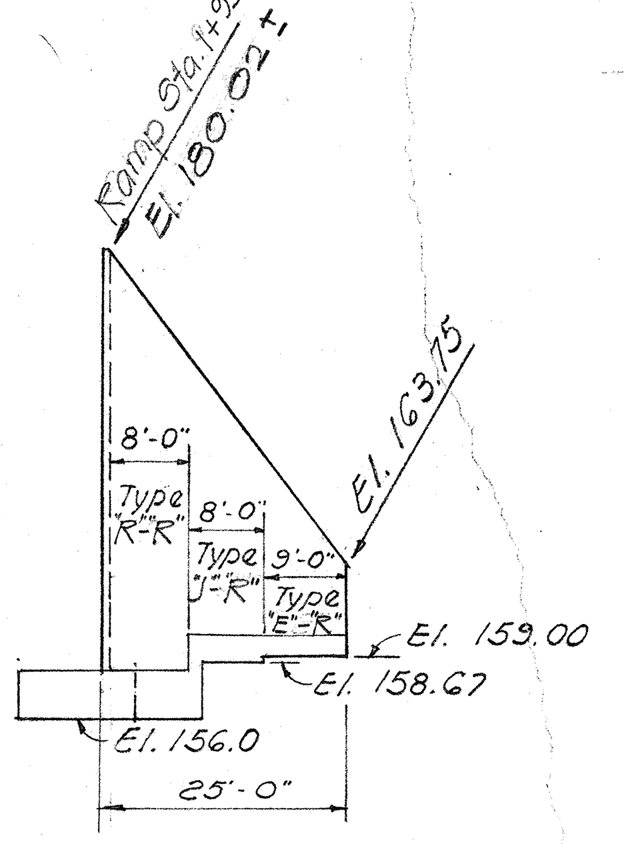
TYPE (FOOTING ON ROCK) SEE SCHEDULE

Scale: 1" = 20'-0"


Ramp Sta. 0+00
P.O.T. Sta. 95+23.61
Frwy. Sta. 95+23.61
Sta. 95+24.77
El. 178.32
D
R4
Rail Post
9'-0" o.c. thruout
Sta. 1+40
El. 179.73±
Ramp Sta. 1+95.00
El. 180.02±
Reference top Ret. Wall- See typical section
Abut. 2
Type "X"-"R"
Type "U"-"R"
Type "T"-"R"
Type "S"-"R"
Exist. Grade
El. 144.0
El. 151.25
El. 152.5
El. 153.5
El. 155.0
El. 156.0
4"ɸ tile drains @ 10'-0" o.c.
Bal.
6 · Spaces @ 30'-0" = 180'-0"

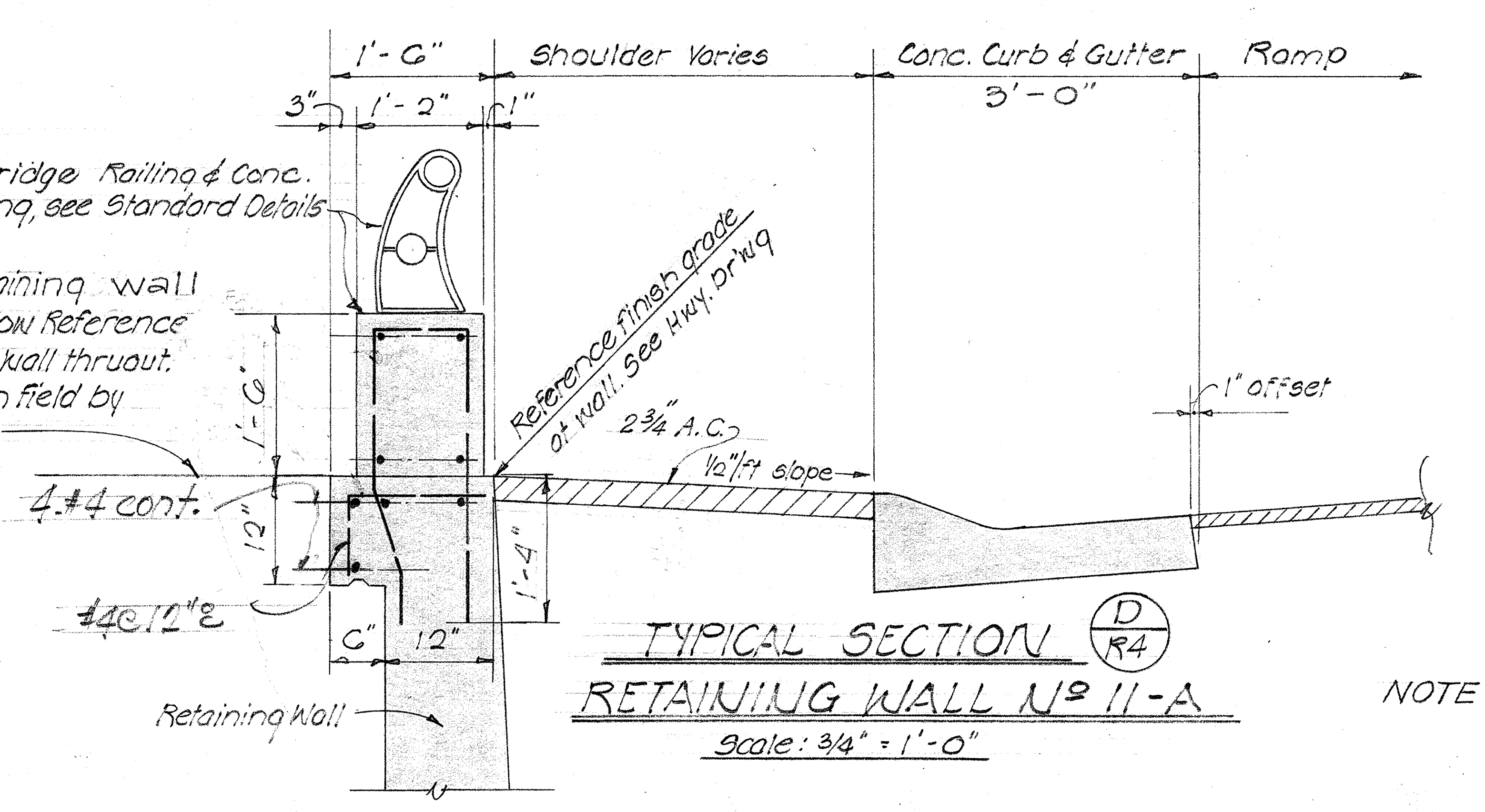
ELEVATION (B/R4)

Vert. - 1" = 10'-0" Horiz. - 1" = 20'-0"


Ramp Sta. 1+95.00
El. 180.02±
El. 163.75
8'-0"
Type "R"-"R"
8'-0"
Type "J"-"R"
9'-0"
Type "E"-"R"
El. 159.00
El. 158.67
El. 156.0
25'-0"

ELEVATION (C/R4)

Vert. 1" = 10'-0" Horiz. 1" = 20'-0"


1'-6"
3"
1'-2"
1"
Shoulder Varies
Conc. Curb & Gutter
3'-0"
Ramp
Ramp 11-A
Metal Bridge Railing & Conc. Railing, see Standard Details
Reference Top of Retaining wall
Top of Ret. Wall to follow Reference Finish Grade Line at wall thruout.
To be determined in field by the Engineer.
Reference finish grade at wall. See Hwy. Dr'wg
2¾" A.C.
½"/ft slope
1" offset
4-#4 cont.
1'-6"
12"
1'-4"
#4 @ 12"
6"
12"
Retaining Wall

TYPICAL SECTION (D/R4) RETAINING WALL Nº 11-A

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

NOTE: For concrete retaining wall details and reinforcement, refer to retaining wall standard sheet # 180.

RETAINING WALL Nº "11-A"

ESTIMATED QUANTITIES

ITEM	TOTALS	
Class A-1 Concrete	501	c.y.
Reinforcing Steel	63,168	lbs.
Filter Material	151	c.y.
Structural Exc.	565	c.y.
Metal Bridge Railing	174	Lin. Ft.
Concrete Railing	195	Lin. Ft.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALLS
Nº "11-A" & Nº "12-1B"

LUNALILO FREEWAY PROJ. Nº I-H1-1(4):24

JUNE 1962

SHEET No. R4 OF SHEETS

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY DATE
DRAWN BY H. Mizumi "
TRACED BY "
DESIGNED BY T.M. "
QUANTITIES BY H.M. W.B. "
CHECKED BY P. YAMASHITA J.T.O. "

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	178	217

98
99
100
101
℄ Freeway
Remove existing trees in Lot Tax Key № 3-2-13:02, necessary for construction of Retaining Wall № 11-OB. Cost of removal incidental to various contract items involved in constructing CRM walls.
C.R.M. wall - Type C.R.M.-I
Begin Wall
13'-0"
R/W Line and front face of wall thruout.
End Wall Sta. 101+60
R/W
A R5
6'-0" chain link fence
El. 174.50
El. 167.00
13'-0"
PLAN - RET. WALL № "11-OB"
SCALE: 1" = 20'-0"
ELEVATION A R5
6'-0" chain link fence Hwy. Item
El. 174.50
El. 176.00 Sta. 97+50
Exist. Ground far face
4" dia. drains @ 10'-0" o.c.
El. 178.00 Sta. 99+50
El. 180.00 Sta. 100+00
El. 183.00 Sta. 100+50
El. 184.00 Sta. 101+00
El. 183.50 Sta. 101.60
Retaining wall - See Typical Stem Reinforcement Schedule for size, arrangement and spacing. Bend bars at opening.
F R5
2-#6 x 8'-0" long added 4" apart - each face of wall. Centered on opening.
5-#8 @ 5" far face of wall
3-#4 @ 10" front face of wall Added
Band cont. vert. thruout each side of opening. Extend & bend into ftg. Similar to wall reinf.
1-#6 x 5'-0" long diag. each side & each face of opening as shown
E R5
Top of footing
Typ. Retaining Wall Stem reinf. See schedule for size arrangement & spacing. Stop bars at opening.
WALL ELEVATION D R5
Scale: ½" = 1'-0"
ELEVATION
SCALE: HORIZ. = 1" = 20'-0" VERT. = 1" = 10'-0"
Freeway ℄
Reference front face of wall
Left E.P. (℄)
303° 05' 40"
2
3
4
Begin Wall Sta. 2+13.00
Sta. 2+21.00
(Distance 87.03')
301° 36' 58"
303° 05' 40"
Light Standard on top of wall. See Highway Lighting Drawings.
P.O.T. Sta. 3+42.12
Sta. 103+73.34
P.O.T. Sta. 3+86.27
Sta. 4+22.07
Sta. 4+25.23
P.O.T. Sta. 4+20.43
R = 1706.00'
D R5
B R5
For Retaining Wall Footing Plan at Col. No. 20. See Sht. No. 177
See Det. "X"
R = 524.00'
R = 594.00'
℄ col. 20 for future overpass. For col. reinf. see Schedule & Typ. Det. Sht. #154
307° 23' 22"
33.22'
55°
30" hole in wall for 24" C.M.P. See Elev. Below
Lighting Standard on top of wall. See Highway Lighting Drawings.
P.C. Sta. 5+48.20
Sta. 5+30.00
End Wall Sta. C 4+28.00
30.00'
Reference front face of wall
R/W Line
Top Cut
Fill Cut
LAYOUT PLAN - RETAINING WALL № "12-KO"
Scale: 1" = 20'-0"
(TYPE - FOOTING ON ROCK)
℄ Sta. 103+73.34
℄ Col. 20
½" premolded jt. filler
Reference front face of wall
Col. reinf. see Schedule for size, no. & arrangement
3'-0"
DETAIL "X" Scale: ¼" = 1'-0"
Front face - Typical Ret. Wall stem reinf. Bend as shown at opening.
Far face - Typical Ret. Wall stem reinf. Bend as shown at opening
½" premolded filler cradle as directed by the Engineer
Inv. El. ~~186.13~~ 185.49
2-#6 x 8'-0" long each face of wall
Typ. Ret. Wall stem reinf. Stop bars at opening.
SECTION F R5
Scale: ½" = 1'-0"
Band - 5-#8 @ 5" far face
℄ 4+00
30" Dia. hole
Band - 3-#4 @ 10" cont. vert. Front face. Added
Reference - Front face of wall
SECTION E R5
Scale: ½" = 1'-0"
Wrap each vert. column bar with burlap and seal with Asphalt for future welding.
12" concrete protective jacket
Reference Top of Ret. Wall
Level
12"
10"
DETAIL C R5
Scale: ½" = 1'-0"
℄ column for future overpass
See protective jacket det. C R5
Sta. 2+13.00 El. 180.75
Sta. 3+00 El. 194.50
Sta. 3+50 El. 197.50
℄ Sta. 103+73.34
Sta. 4+00 El. 199.50
1'-0" drip far face
Sta. 4+50 El. 201.00
Sta. 5+38.00 El. 203.00
Sta. C 4+17.00 El. 202.76
Sta. C 4+28.00
El. 202.00
El. 196.50
4" dia. drains @ 10'-0" o.c.
℄ 4+00
30" Dia. hole See Plan Inv. El. ~~186.13~~ 185.49
Top of Curb Far face
El. 181.00
El. 181.50
El. 182.00
El. 183.00
El. 183.50
El. 185.00
El. 182.50
El. 186.00
El. 187.00
El. 188.00
El. 189.25
El. 189.15
El. 190.50
El. 191.50
El. 192.50
El. 194.00
El. 195.00
TYPE L-2 Wall
Balance
Type L-2 Wall
Type L-2 Wall
22'-0" | 14'-0" | 24'-0" | 26'-0" | 10'-0" | 24'-0" | 20'-0" | Balance | 11'-0" | 36'-0" | 22'-0" | 24'-0" | 23'-0" | 39'-0" | 10'-0" | 22'-0" | 17'-0" | 21'-0" | 11'-0"
Type "B" | Type "C" | Type "E" | Type "F" | Type "G" | Type "H" | NK-12 | NK-13 | "K-R" NK-13 | M-R | Type "K-R" | Type "J-R" | Type "K-R" | TYPE "N-R" | NK | 16 | Type "M-R" | Type "K-R" | Type "I" | Type "H" | Type "E"
11'-0" | 49'-0" | 50'-0" | 30'-0" | Balance | Balance | 14'-0" | 15'-0" | 21'-0" | 22'-0" | 24'-0" | 23'-0" | 19'-0" | 20'-0" | 10'-0" | 22'-0" | 17'-0" | 15'-0" | 17'-0"
Measured along front face of wall
Col. Width
ELEVATION B R5
Scale: Horiz. = 1" = 20'-0" Vert. = 1" = 10'-0"

ESTIMATED QUANTITIES		
RETAINING WALL № "11-OB"		
C.R.M.	305	c.y.
Structural Exc.	200	c.y.
Filter Material	17	c.y.

RETAINING WALL № "12 K-O" ESTIMATED QUANTITIES

ITEM	TOTALS	
Class A-1 Concrete	400	c.y
Reinforcing Steel	29,500	lbs.
Filter Material	120	c.y.
Structural Exc.	788	c.y.

NOTE:
For concrete retaining wall details and reinforcement refer to retaining wall standard sheets # 179 & 180

For typical C.R.M. wall detail, refer to sheet # 179.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALLS
№ "11-OB" & № "12-KO"

LUNALILO FREEWAY Proj. No. I-H1-1(4):24

JUNE 1962

SHEET No. R5 OF SHEETS

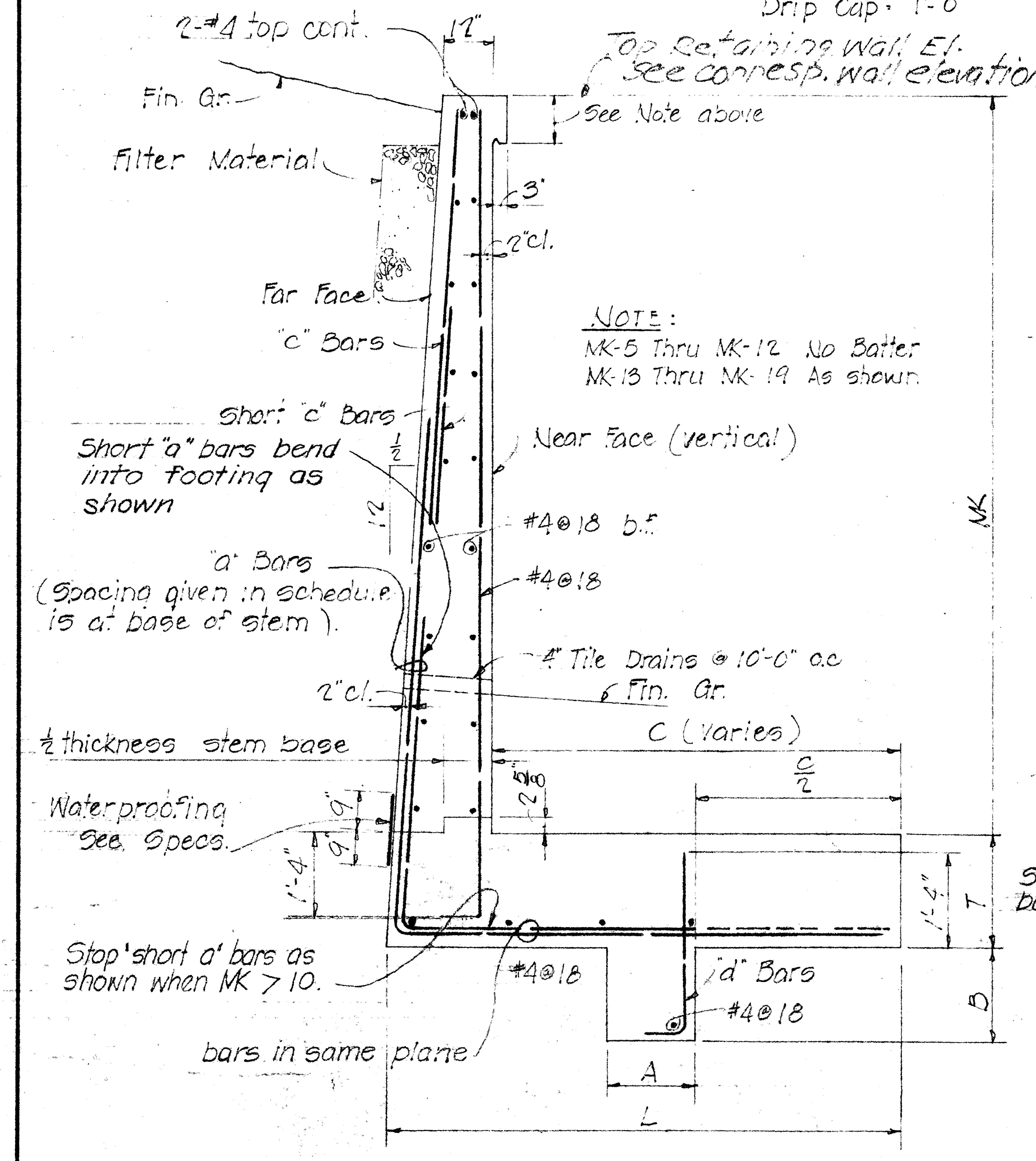
178

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY ______ DATE
DRAWN BY N.Y. J.F. "
TRACED BY "
DESIGNED BY T.M. J.F. N.Y. "
QUANTITIES BY "
CHECKED BY P. Yamashita T.T.O. "

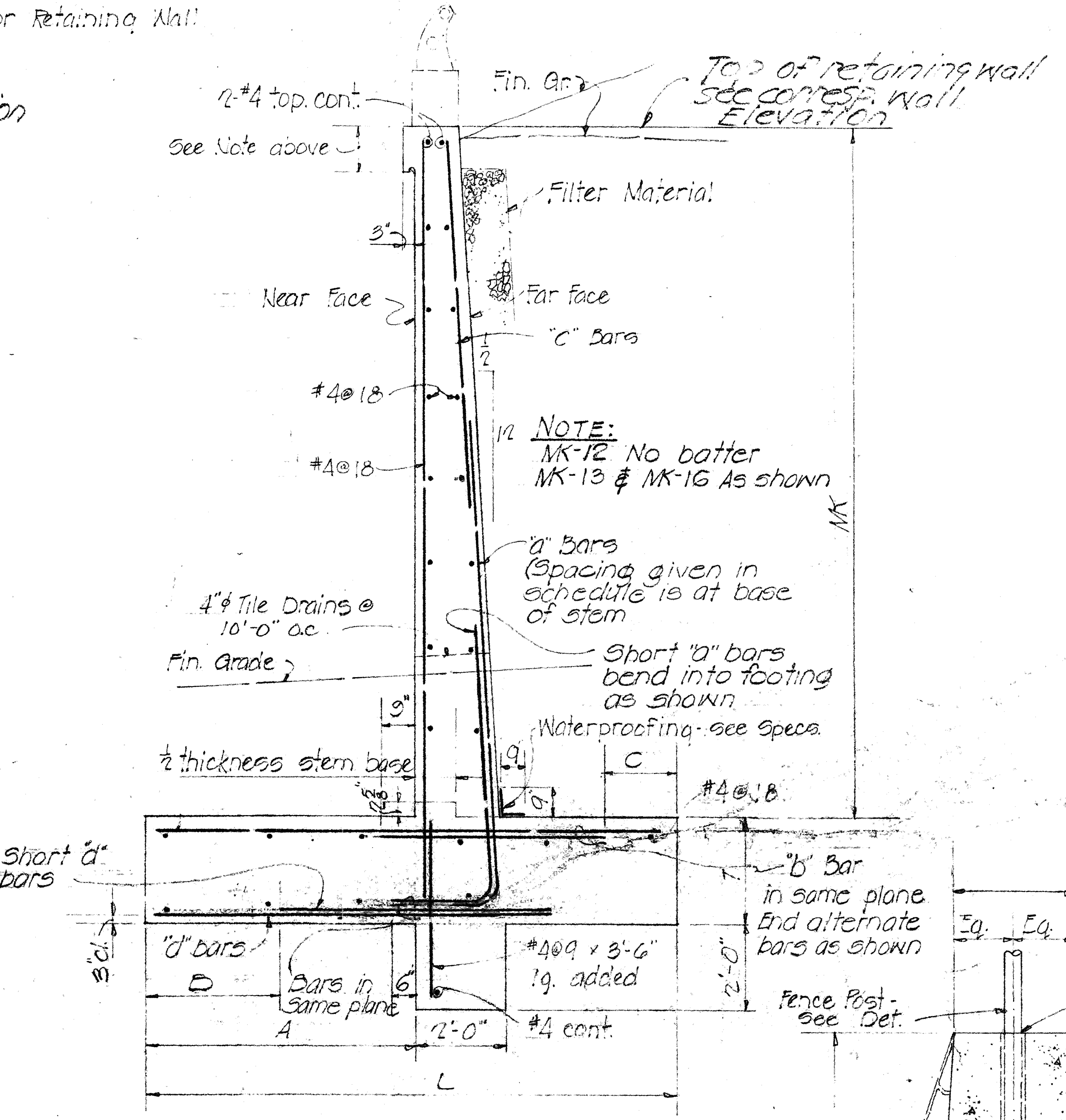
PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	179	217

NOTE:
Height of Drip Cap varies for Wing Walls pour to match Structure Drip Cap. Height for Retaining Wall Drip Cap: 1'-0"


2-#4 top cont.
12"
Top Retaining Wall El. See corresp. wall elevation
Fin. Gr.
See Note above
Filter Material
3"
2"cl.
Far Face
"c" Bars
NOTE:
MK-5 Thru MK-12 No Batter
MK-13 Thru MK-19 As shown
Short "c" Bars
Short "a" bars bend into footing as shown
Near Face (vertical)
1/2
12
#4@18 b.f.
"a" Bars (Spacing given in schedule is at base of stem).
#4@18
4" Tile Drains @ 10'-0" o.c.
2"cl.
Fin. Gr.
1/2 thickness stem base
C (Varies)
C/2
Waterproofing See Specs.
9"
9"
1'-4"
2"
1'-4"
T
MK
Stop 'short a' bars as shown when MK > 10.
#4@18
"d" Bars
#4@18
B
bars in same plane
A
L

TYPICAL SECTION
TYPE "L-1" WALL


2-#4 top cont.
See Note above
Fin. Gr.
Top of retaining wall See corresp. Wall Elevation
Filter Material
3"
Near Face
Far Face
"c" Bars
1/2
#4@18
#4@18
12
NOTE:
MK-12 No batter
MK-13 & MK-16 As shown
MK
"a" Bars (Spacing given in schedule is at base of stem
4"ϕ Tile Drains @ 10'-0" o.c.
Fin. Grade
Short "a" bars bend into footing as shown
9"
Waterproofing - see Specs.
1/2 thickness stem base
9"
C
#4@18
Short "a" bars
T
"b" Bar in same plane End alternate bars as shown
3"cl.
"d" bars
B
Bars in Same plane
6"
#4@9 × 3'-6" lg. added
2'-0"
A
2'-0"
#4 cont.
L

TYPICAL SECTION
TYPE "L-2" WALL

TYPE "L-1" WALL SCHEDULE

***	MK	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	L	5'-6"	6'-6"	7'-6"	8'-0"	8'-6"	9'-6"	10'-0"	10'-6"	11'-0"	12'-0"	12'-6"	13'-6"	14'-0"	15'-0"
	T	18"	18"	18"	18"	18"	18"	18"	18"	18"	20"	22"	24"	24"	26"
	A	14"	14"	14"	14"	16"	18"	20"	20"	20"	24"	24"	24"	24"	24"
	B	14"	14"	14"	14"	16"	18"	18"	20"	20"	24"	24"	26"	26"	28"
*	"c" Bars	—	—	—	—	—	#4	#4	#4	#4	#4	#4	#4	#4	#5
**	"a" Bars	#4@12"	#3@6"	#4@6"	#4@5½	#4@5½"	#5@5	#6@6"	#6@8"	#6@6"	#6@5½"	#6@5"	#7@6"	#7@5"	#8@6
	"d" Bars	#3@12"	#3@12"	#3@12"	#3@10	#4@12"	#4@10"	#4@12"	#4@12"	#4@12"	#4@11"	#4@10"	#5@12"	#5@10"	#6@10

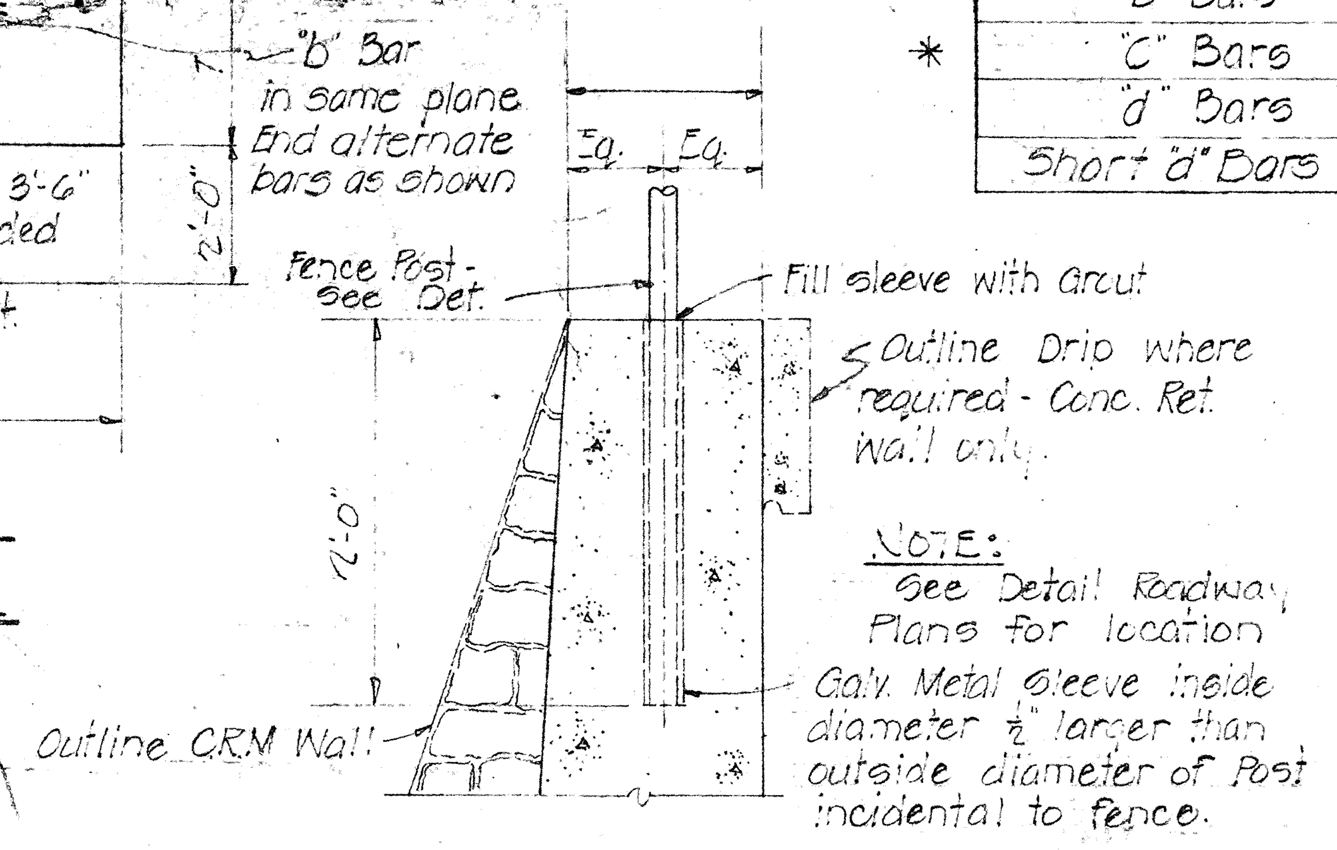
TYPE "L-2" WALL SCHEDULE

***	MK	12	13	14	15	16	17
	L	8'-0"	9'-0"			11'-0"	
	T	18"	18"			21"	
	A	2'-9"	4'-3"			5'-3"	
	B	—	2'-6"			3'-0"	
	C	2'-0"	12"			2'-0"	
**	"a" Bars	#6@6"	#8@8"			#6@5"	
	"b" Bars	#7@9"	#5@8"			#7@9"	
*	"C" Bars	#4	#4			#4	
	"d" Bars	#6@6"	#8@16"			#8@12"	
	Short "a" Bars	—	#8@16"×4.5'			#8@12"×5.0'	

* See vertical reinforcing steel arrangement on sheet # 180 for reinforcing bar length and arrangement.

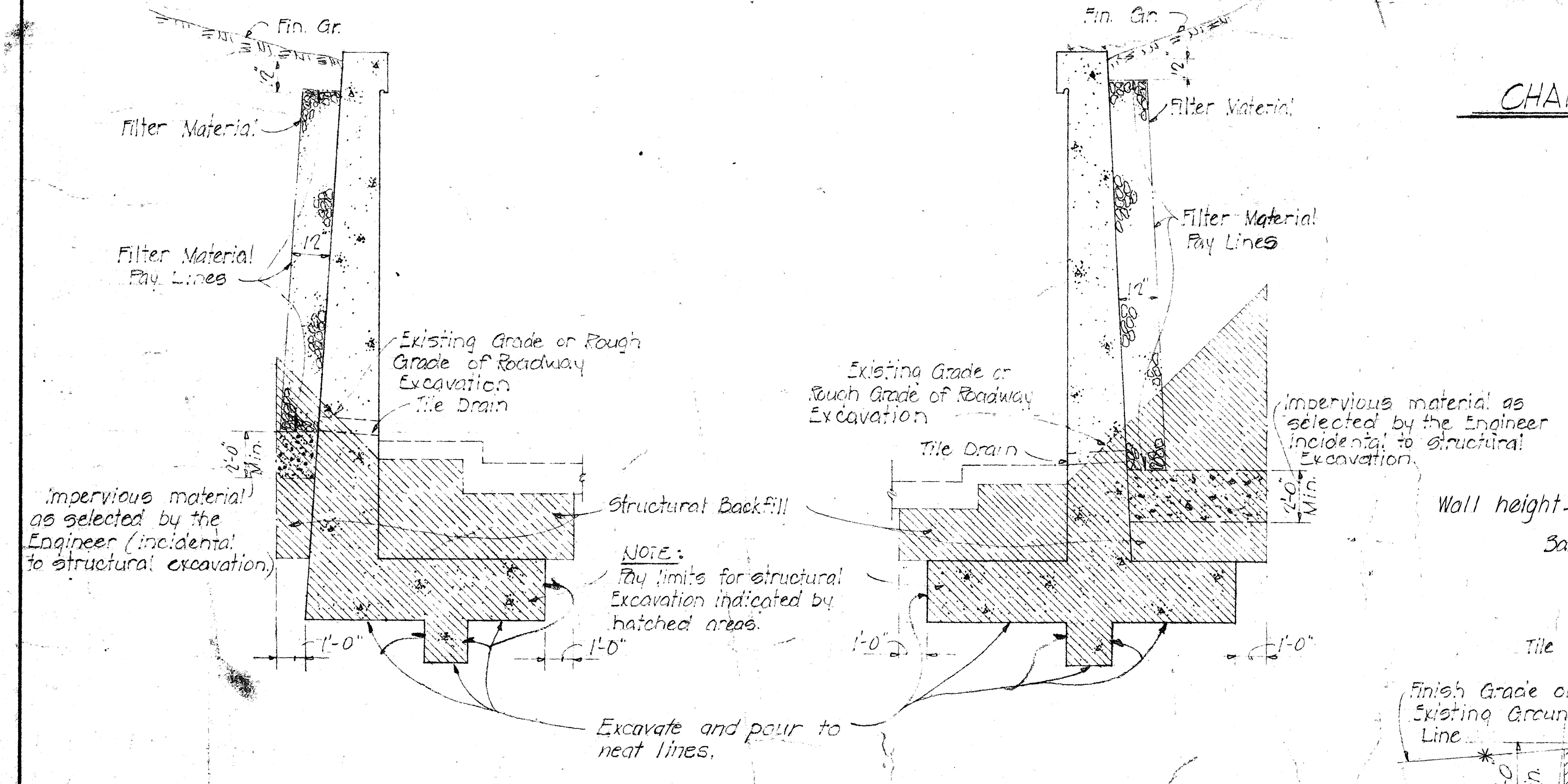
** See vertical reinforcing steel arrangement on sheet # 180 for length, arrangement and spacing of combined "a" and short "a" bars.

*** In locating vertical reinforcing steel arrangement, MK numbers as indicated on the schedule refer to the corresponding "h" as indicated on sheet # 180.


Eq.
Eq.
Fence Post - See Det.
Fill sleeve with Grout
Outline Drip where required - Conc. Ret. Wall only.
2'-0"
Outline CRM Wall
Galv. Metal Sleeve inside diameter ½" larger than outside diameter of Post incidental to fence.

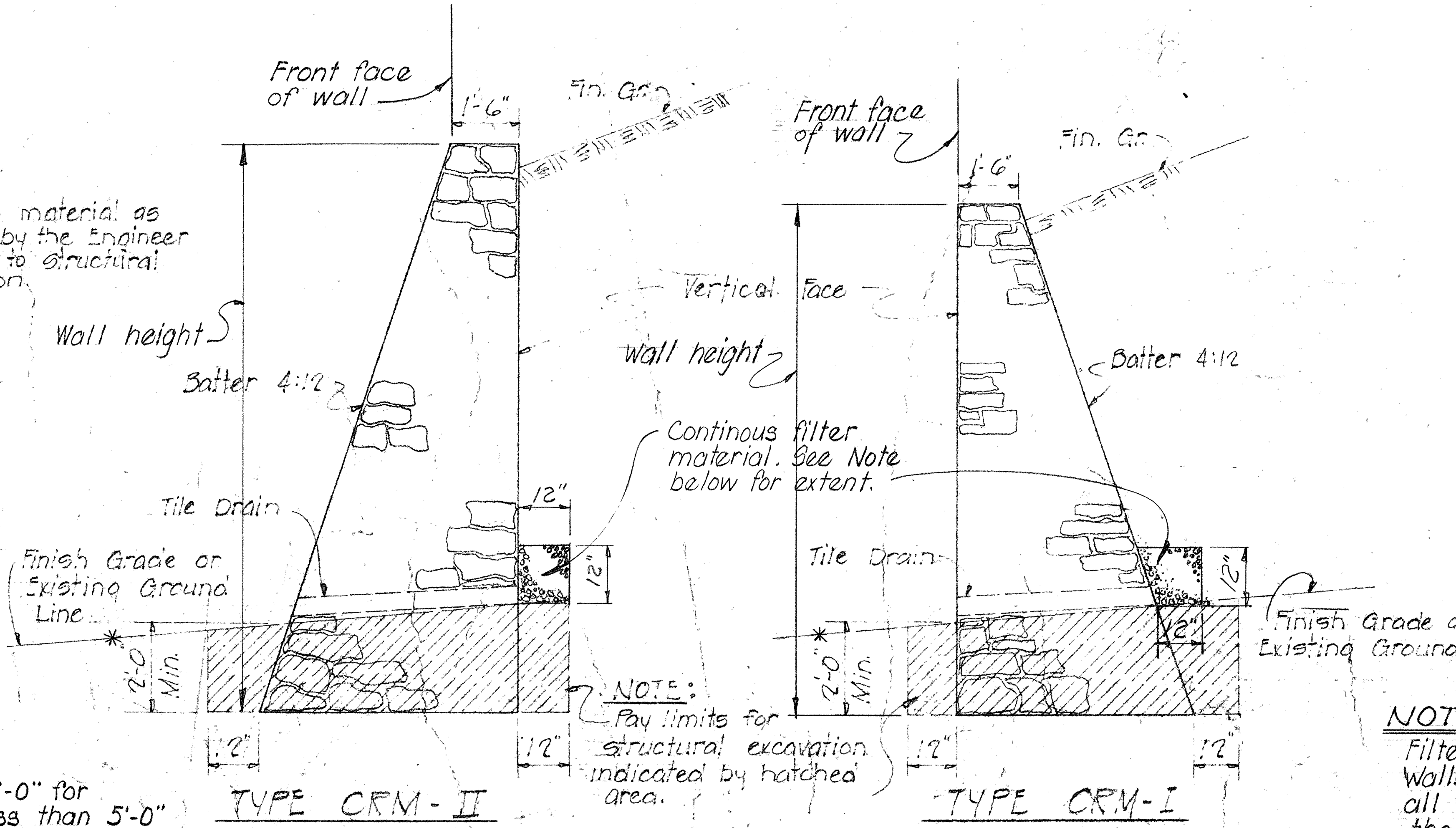
NOTE:
See Detail Roadway Plans for location

CHAIN LINK FENCE POST DETAIL


Fin. Gr.
12"
Filter Material
12"
Filter Material Pay Lines
Existing Grade or Rough Grade of Roadway Excavation
Tile Drain
2'-0" Min.
Impervious material as selected by the Engineer (incidental to structural excavation)
Structural Backfill
1'-0"
1'-0"
Fin. Gr.
12"
Filter Material
Filter Material Pay Lines
12"
Existing Grade or Rough Grade of Roadway Excavation
Tile Drain
Impervious material as selected by the Engineer incidental to structural Excavation.
2'-0" Min.
1'-0"
1'-0"

NOTE:
Pay limits for structural Excavation indicated by hatched areas.

Excavate and pour to neat lines.


Front face of wall
1'-6"
Fin. Gr.
Wall height
Batter 4:12
Tile Drain
12"
12"
Finish Grade or Existing Ground Line
*
2'-0" Min.
12"
12"
Front face of wall
1'-6"
Fin. Gr.
Vertical Face
Wall height
Batter 4:12
Continous filter material. See Note below for extent.
Tile Drain
12"
12"
2'-0" Min.
Finish Grade or Existing Ground Line
12"
12"

NOTE:
Pay limits for structural excavation indicated by hatched area.

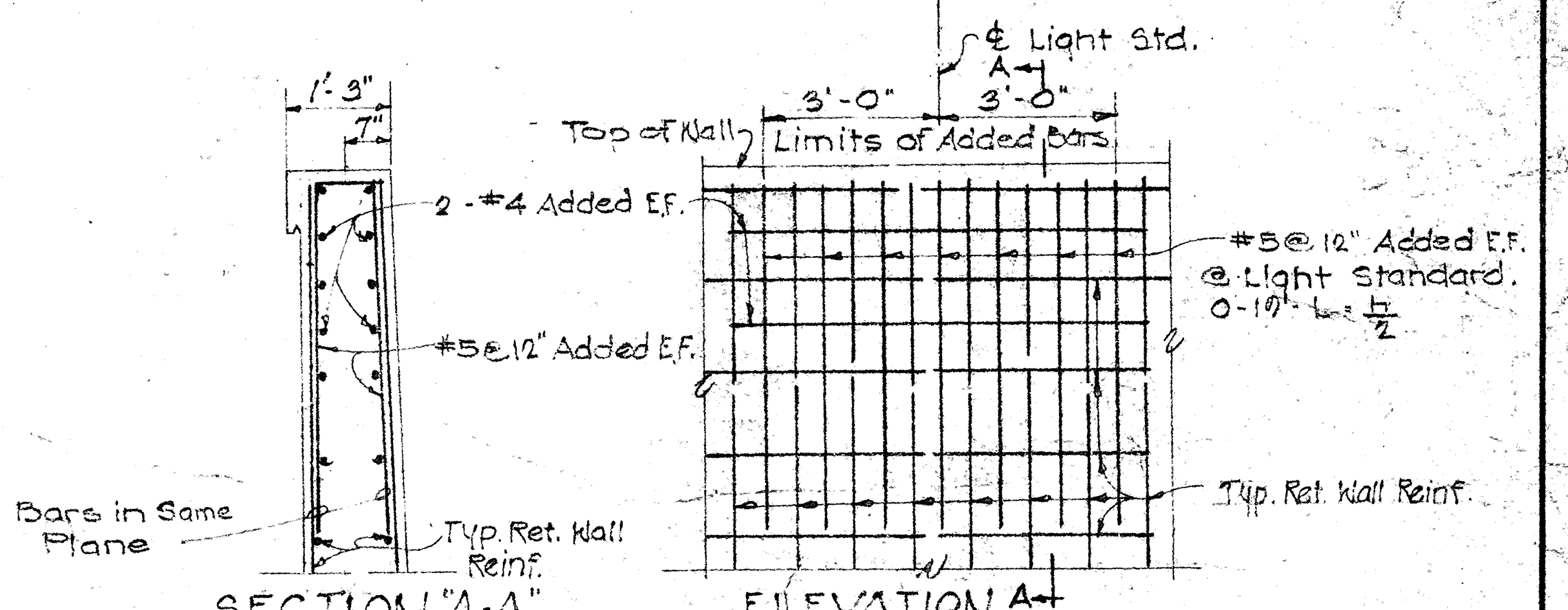
* Use minimum 1'-0" for wall heights less than 5'-0"

TYPE CRM - II

TYPE CRM - I

TYPICAL CRM WALL SECTION

NOTE:
Filter material behind CRM Walls shall be place for all wall heights greater than 5'-0".


1'-3"
7"
2-#4 Added E.F.
#5@12" Added E.F.
Bars in Same Plane
Typ. Ret. Wall Reinf.
℄ Light Std.
A
3'-0"
3'-0"
Top of Wall
Limits of Added Bars
#5@12" Added E.F. @ Light Standard. 0-10' h = h/2
Typ. Ret. Wall Reinf.
A

SECTION "A-A"

ELEVATION

TYPICAL DETAIL SHOWING ADDED WALL REINF. AT LIGHT STANDARD

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD RETAINING WALL
DETAILS • TYPES "L-1," "L-2,"
"CRM-I", "CRM-II"
LUNALILO FREEWAY Proj. No. I-H1-1(4):24
SEPT. 1962

SHEET No. 3-1 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY P. Yamashita	J.T.D.

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAWS	I-HI-1(4)	1963	180	217

BATTERED WALL VARIES, SEE WALL SECTION
NEAR FACE OF WALL
a
12"
A
B
12"
PLAN
"a" BARS BENT INTO FTG, SEE WALL SECTION
SECT. A-A
t
1¾"CL.
#4@12, Hook 18"
#4@18
1¾"CL.
12"
12"
1¾" CL.
1¾" CL.
#4@18
#4@12
1'-6"
3"CL
SECT. B-B
STEPPED FTG. DET.
SCALE: 3/8"=1'-0"
JOINT MAY BE FORMED WITH 1/8" MASONITE AND CUT BACK TO THE ROOT OF THE CHAMFER ON THE EXPOSE FACE
3/4" CHAMFER
WALL FACE
1/8"
CONT. VERT. CONTROL JOINT ON BOTH FACE OF WALL ONLY.
30'-0" O.C.
30'-0" O.C.
BACK FACE
FLASHING COMPOUND BACK FACE ONLY
CONTROL JOINT ON EACH FACE OF WALL THRUOUT TO TOP OF FOOTING. SEE ADJACENT DETAIL AND AS DIRECTED BY ENGINEER
WALL THICKNESS
FRONT FACE
ALTERNATE CONTRACTION JOINT DETAIL
FINISH GRADE
12"
FILTER MAT'L. CONT. HORIZONTALLY
4"⌀ TILE DRAIN 10'-0" O.C.
EXIST'G. GROUND LINE OR ROADWAY CUT LINE
2'-0" MIN.
IMPERVIOUS MAT'L. - SEE CASE II
STRUCTURAL BACKFILL
12"
12"
EXCAVATE AND POUR TO NEAT LINE
CASE I
FINISH GRADE
FILTER MAT'L.
THEORETICAL 1:1 ROADWAY CUT LINE
4"⌀ TILE DRAIN 10'-0" O.C.
FIN. Gr.
2'-0" MIN.
IMPERVIOUS MATERIAL AS SELECTED BY THE ENGINEER. INCIDENTAL TO STRUCT. EXC. WHEN "h" IS 2'-0" OR LESS ALL BACKFILL BELOW WEEP HOLE LEVEL SHALL BE IMPERVIOUS MAT'L.
12"
EXCAVATE & POUR TO NEAT LINE
CASE II
NOTE: CROSSHATCHED AREAS REPRESENT LIMITS OF STRUCTURAL EXCAVATION PAY LINE. ALL OTHER EXCAVATION SHALL BE PAID AS ROADWAY EXCAVATION.
STRUC. EXC. & DRAINAGE DETAILS
NO SCALE
E
E
1'-0"
ONE LAYER 55# COMPOSITION ROOFING
NEAR FACE
KEY
C
C
CONSTR. JT.
FLASHING COMPOUND
JOINT ELEVATION
VIEW D-D
D
D
½" CHAMFER
1½"
½"
1¾"
2"
½" PREMOLDED JOINT FILLER
½" PREMOLDED JOINT FILLER
½"
½"
4"
4"
VARIES
FLASHING COMPOUND SEE SPECIFICATIONS
SECTION C-C
TYPICAL EXPANSION JOINT DETAIL
NO SCALE
NOTE: CONTRACTION JOINT SEE NOTE ABOVE
TOP WALL
ONE LAYER 55# COMPOSITION ROOFING (EXP. OR CONTRACTION)
½" PREMOLDED JOINT FILLER (EXP.) ONE LAYER 55# COMPOSITION ROOFING (CONTRACTION JOINT)
SECT. E-E
SPLICE "c" BARS 32 "c" BAR DIAMETERS
NUMBER BESIDES "a" BARS INDICATES DISTANCE FROM TOP OF FTG TO UPPER END OF "a" BAR.
h=4'
h=5'
h=6'
h=7'
h=8'
h=9'
h=10'
h=11'
h=12'
h=13'
h=14'
h=15'
h=16'
h=17'
h=18'
h=19'
h=20'
h=21'
h=22'
h=23'
h=24'
h=26'
h=28'
h=30'
3'-6
4'
4'-6
5'
6'
6'
7'
5'
7'
9'
5'-6
9'
5-6
11'
9'
11'
6'
4'-0 LONG
9'-6
6'
4'-0 LONG
9'-6
6'-6
5'-0 LONG
10'
6'-6
5'-0 LONG
10'
7'
5'-6 LONG
11'
7'
5'-6 LONG
11'
8'
6'-0 LONG
12'
8'
6'-0 LONG
12'
9'
9'-0 LONG
13'
10'
9'-0 LONG
15'
11'
9'-0 LONG
17'
"c" BARS
SHORT "c" BARS
"a" BARS
SHORT "a" BARS
12"
12"
12"
6"
6"
5½"
6"
5"
6"
8"
6"
5½"
5"
6"
5"
6"
5"
6"
5½"
6"
5½"
5½"
5"
5"
"a" BAR SPACING
VERTICAL REINFORCING STEEL ARRANGEMENT
NO SCALE.
REFERENCE DRIP LINE
1'-3"
ALUMINUM RAILING AS REQUIRED SEE STANDARD DETAILS.
12" UNLESS NOTED ON THE PLANS
2" CL.
Top Retaining wall See corresp. wall Elev.
¾" CHAMFER
3" drip except as otherwise noted see corresp. det.
REFERENCE FRONT FACE OF WALL - VERTICAL
FAR FACE:
VERTICAL ON "A" TO "I" INCLUSIVE
BATTER FROM TOP ½:12 FOR "J" TO "U" INCLUSIVE
BATTER FROM TOP, ¾:12 FOR "V" TO "X"
#4@18
"c" BARS
2" CL.
SHORT "c" BARS
#4@18
2" CL.
"a" BARS (SPACING GIVEN IN TABLE IS AT BASE OF STEM)
HALF THICKNESS OF STEM BASE
THESE BARS MAY BE DOWELED USING 20 DIA. LAPS
CONSTRUCTION JOINT WATERPROOFING, SEE STANDARD SPECIFICATIONS.
"b" BARS IN SAME PLAN. END ALTERNATE BARS AS SHOWN WHEN H > 10'.
c
ALT. "b" BARS 9" FOR h > 6'
a
½c
½c
3"
15"
3"CL.
9"
9'
R=9"
t
#4@18
3" CL.
3"CL.
L
h
WALL SECTION
NO SCALE

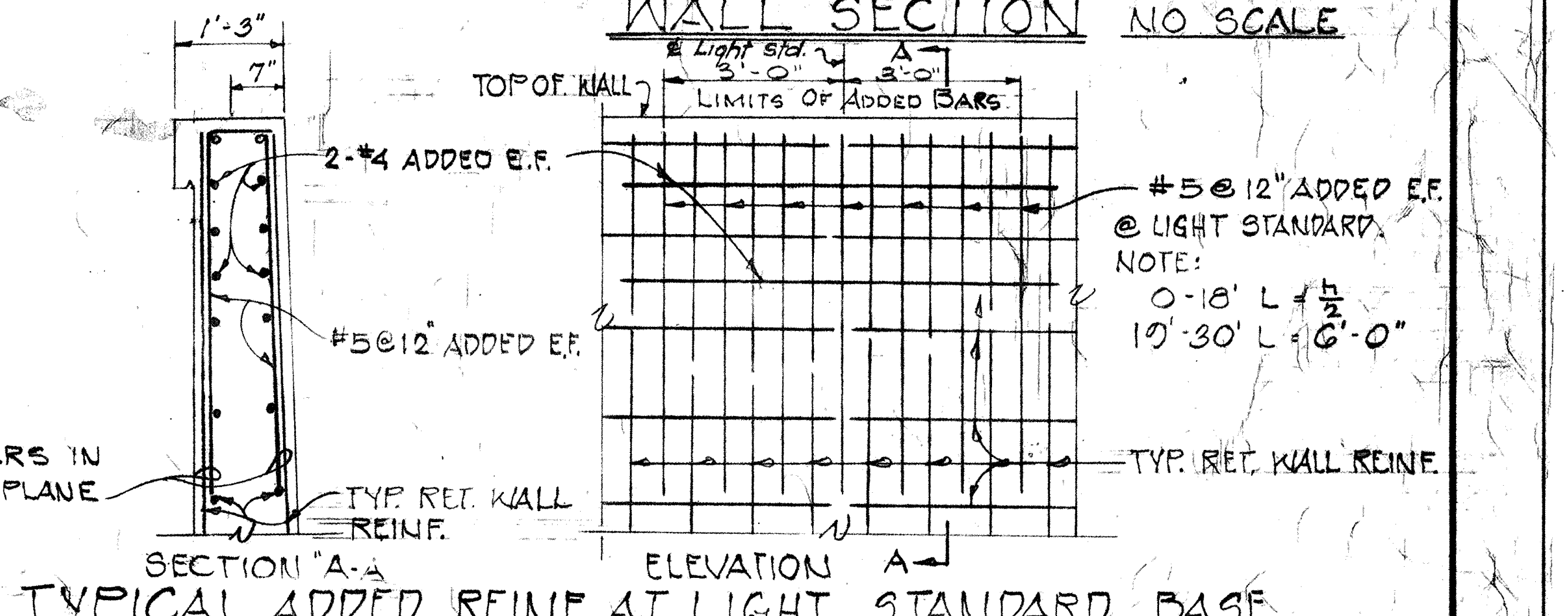
(SPACING OF JOINTS)
CONTRACTION JOINT - 30'-0" MAX.
EXPANSION JOINT - 90'-0" MAX.

NOTE:

CONTRACTION JOINT IS SIMILAR TO EXPANSION JOINT EXCEPT THAT ONE LAYER OF 55# COMPOSITION ROOFING SHALL BE USED IN PLACE OF PREMOLDED JOINT FILLER AND THE JOINT SHALL EXTEND THRU THE STEM ONLY.

TABLE OF DIMENSIONS AND REINFORCING STEEL

MAXIMUM h	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	26'	28'	30'
"a" BARS	#3@12	#3@12	#4@12	#3@6	#4@6	#4@5½	#5@6	#5@5	#6@6	#6@8	#6@6	#6@5½	#6@5	#7@6	#7@5	#8@6	#8@5	#9@6	#9@5½	#10@6	#10@5½	#10@5½	#10@5	#11@5
"c" BARS	—	—	—	—	—	—	—	#4	#4	#4	#4	#4	#4	#4	#4	#5	#5	#6	#6	#7	#7	#7	#7	#7
TYPE (FTG. ON EARTH)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
a	6"	6"	6"	12"	12"	12"	12"	12"	12"	12"	15"	18"	21"	24"	24"	24"	27"	30"	33"	36"	39"	54"	60"	72"
L	2.5'	3.0'	3.5'	4.0'	4.5'	5.0'	5.5'	6.0'	6.5'	7.0'	7.75'	8.25'	9.0'	9.75'	10.5'	11.5'	12.5'	13.5'	14.5'	15.25'	16.0'	18.0'	20.0'	21.0'
t	14"	14"	14"	14"	14"	14"	14"	18"	18"	18"	18"	18"	21"	21"	24"	24"	24"	27"	30"	31"	33"	36"	39"	42"
"b" BARS	#3@12	#3@12	#3@12	#3@12	#3@12	#4@11	#5@9	#5@10	#5@6	#6@8	#6@6	#6@5½	#6@5	#7@6	#7@5	#9@6	#9@5	#10@6	#10@5½	#11@6	#11@5½	#11@5½	#11@5	#11@5
TYPE (FTG. ON ROCK)	A	B	C	D	E	F	G	H	I	J-R	K-R	L-R	M-R	N-R	O-R	P-R	Q-R	R-R	S-R	T-R	U-R	V-R	W-R	X-R
a	6"	6"	6"	12"	12"	12"	12"	12"	12"	12"	15"	18"	21"	21"	21"	21"	24"	27"	30"	33"	36"	42"	48"	54"
L	2.5'	3.0'	3.5'	4.0'	4.5'	5.0'	5.5'	6.0'	6.5'	6.75'	7.25'	7.75'	8.50'	9.25	10.00'	10.50	11.00	11.50	12.00	12.50	13.00	14.00	15.00	16.00
t		14"	14"	14"	14"	14"	14"	18"	18"	18"	18"	18"	18"	18"	18"	21"	21"	21"	24"	24"	24"	27"	30"	36"
"b" BARS	#3@12	#3@12	#3@12	#3@12	#3@12	#4@11	#5@9	#5@10	#5@6	#6@8	#6@6	#6@5½	#6@5	#7@6	#7@5	#9@6	#9@5	#10@6	#9@5½	#10@6	#10@5½	#10@5½	#10@5	#10@6


1'-3"
7"
2-#4 ADDED E.F.
#5@12" ADDED E.F.
BARS IN SAME PLANE
TYP. RET. WALL REINF.
SECTION "A-A"
℄ Light std.
3'-0"
3'-0"
A
TOP OF WALL
LIMITS OF ADDED BARS
#5@12" ADDED E.F. @ LIGHT STANDARD.
NOTE:
0-18' L = h/2
19'-30' L = 6'-0"
TYP. RET. WALL REINF.
ELEVATION
A

TYPICAL ADDED REINF. AT LIGHT STANDARD BASE

GENERAL NOTES

FENCE POST INSERT DETAIL TO BE SAME AS SHOWN ON "L" TYPE WALL DETAILS.
EXCEPT WHERE DETAILED OTHERWISE IN THE PLANS ALL DETAIL ON THIS SHEET GOVERN.

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD RETAINING WALL DETAIL TYPE "T-1"

LUNALILO FREEWAY PROJ. No. I-HI-1(4):24

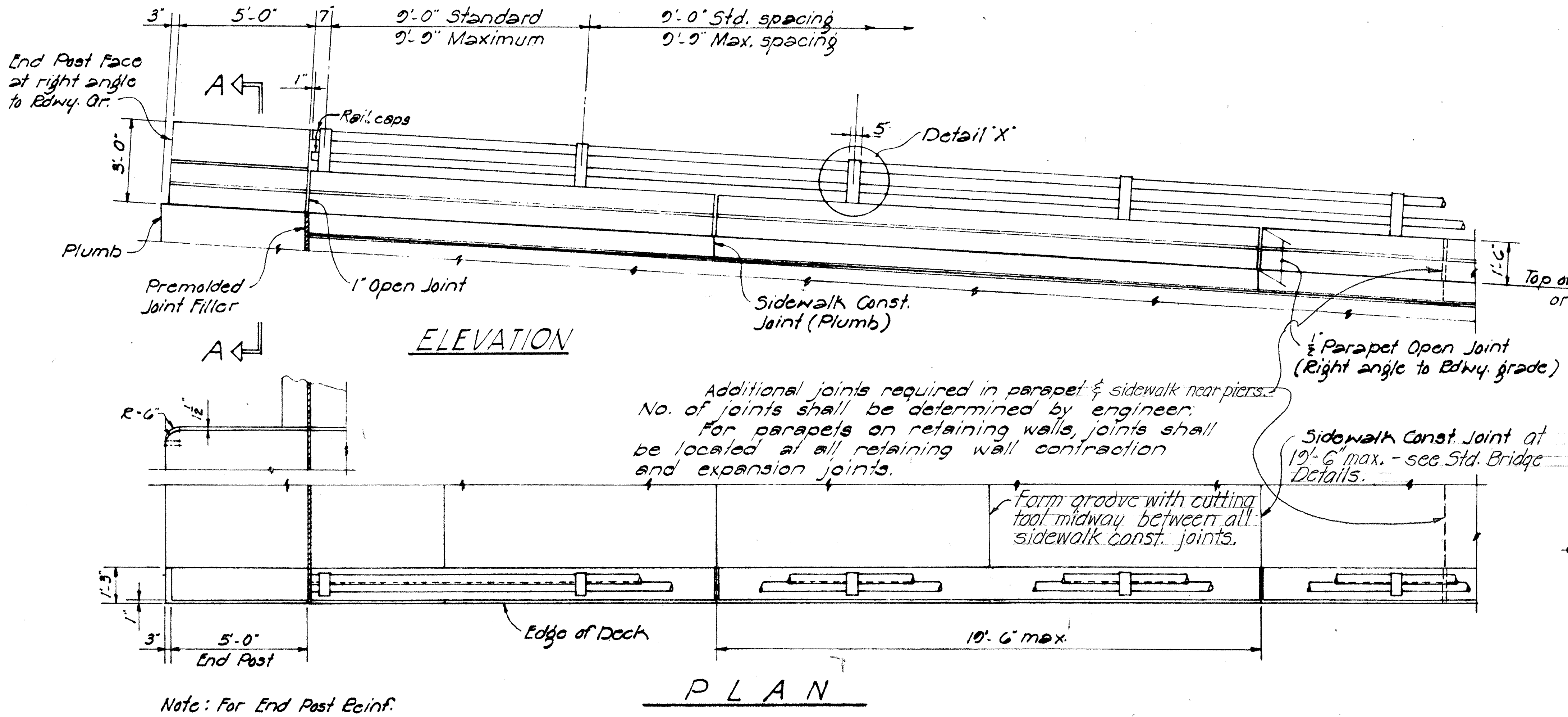
SHEET No. S-2 OF SHEETS

ORIGINAL PLAN
SURVEY PLOTTED BY M.O. DATE 5/15/58
DESIGNED BY P.D. MO 5/20/58
DRAWN BY
TRACED BY
QUANTITIES BY
QUANTITIES CHECKED BY
CHECKED BY E.F. & SHE
NOTE BOOK No.

PRINTED ON DIEPO 1000H CLEARPRINT

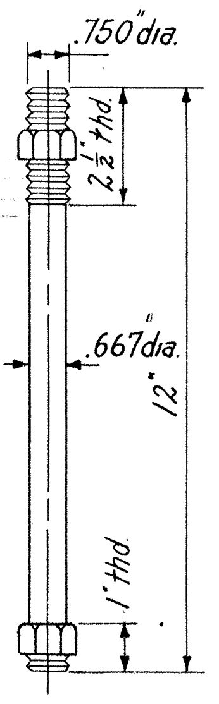
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW	I-H1-1(4)	1963	181	217

May '59
June '60
Sept. '60
Jan. '62


3"
5'-0"
7"
9'-0" Standard
9'-9" Maximum
9'-0" Std. spacing
9'-9" Max. spacing
End Post Face at right angle to Rdwy. Gr.
A
Rail caps
5"
Detail "X"
5'-0"
Plumb
Premolded Joint Filler
1" Open Joint
Sidewalk Const. Joint (Plumb)
1'-6"
Top of Sidewalk or curb
ELEVATION
½" Parapet Open Joint (Right angle to Rdwy. grade)
Additional joints required in parapet & sidewalk near piers. No. of joints shall be determined by engineer. For parapets on retaining walls, joints shall be located at all retaining wall contraction and expansion joints.
Sidewalk Const Joint at 19'-6" max. - see Std. Bridge Details.
Form groove with cutting tool midway between all sidewalk const. joints.
R-6"
1'-3"
5'-0"
End Post
Edge of Deck
19'-6" max.
PLAN
Note: For End Post Reinf. see Std. Bridge Details.

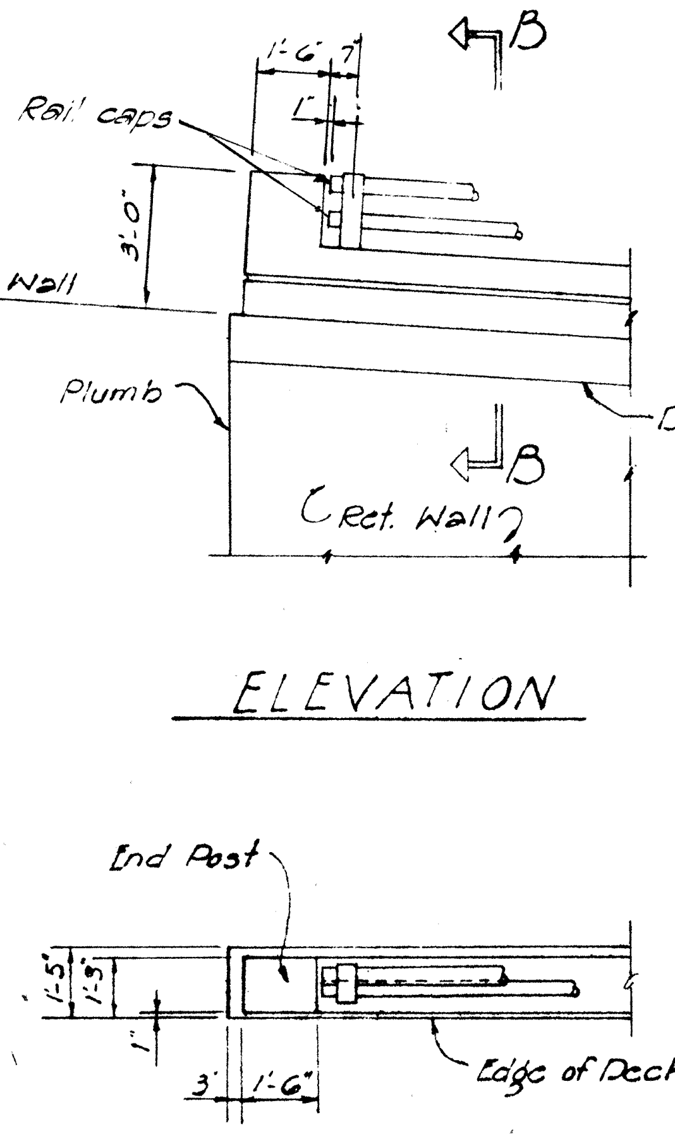
ALUMINUM RAILING DETAIL

Scale - ¼" = 1'-0"


.750 dia.
2¼" thd.
.667 dia.
12"
1" thd.

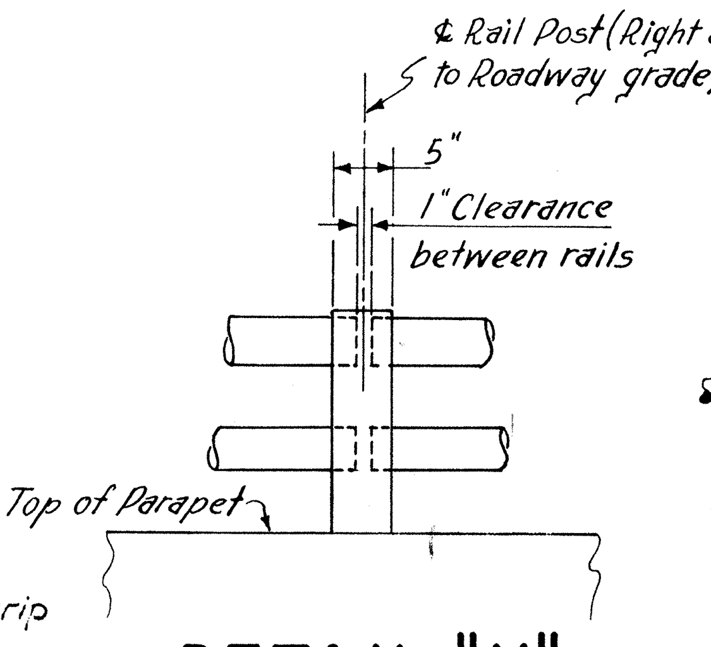
ANCHOR BOLT DETAIL

Scale: 3" = 1'-0"


1'-6"
B
Rail caps
3'-0"
Top of Ret. Wall
Plumb
Drip
Ret. Wall
B
ELEVATION
End Post
1'-5"
1'-6"
3"
Edge of Deck Line
PLAN

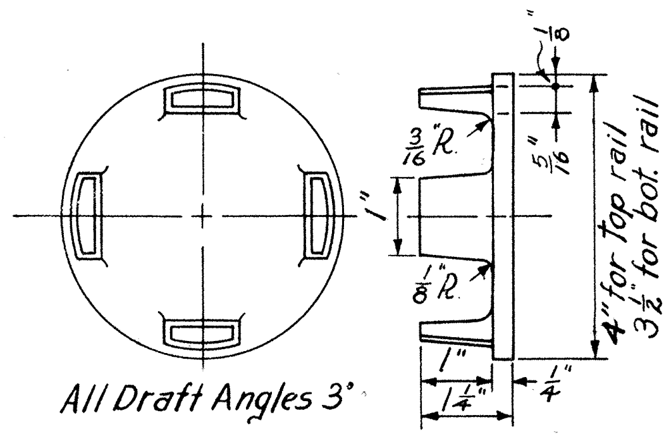
TREATMENT OF RAILING ON RETAINING WALL

Scale - ¼" = 1'-0"


℄ Rail Post (Right angle to Roadway grade)
5"
1" Clearance between rails
Top of Parapet

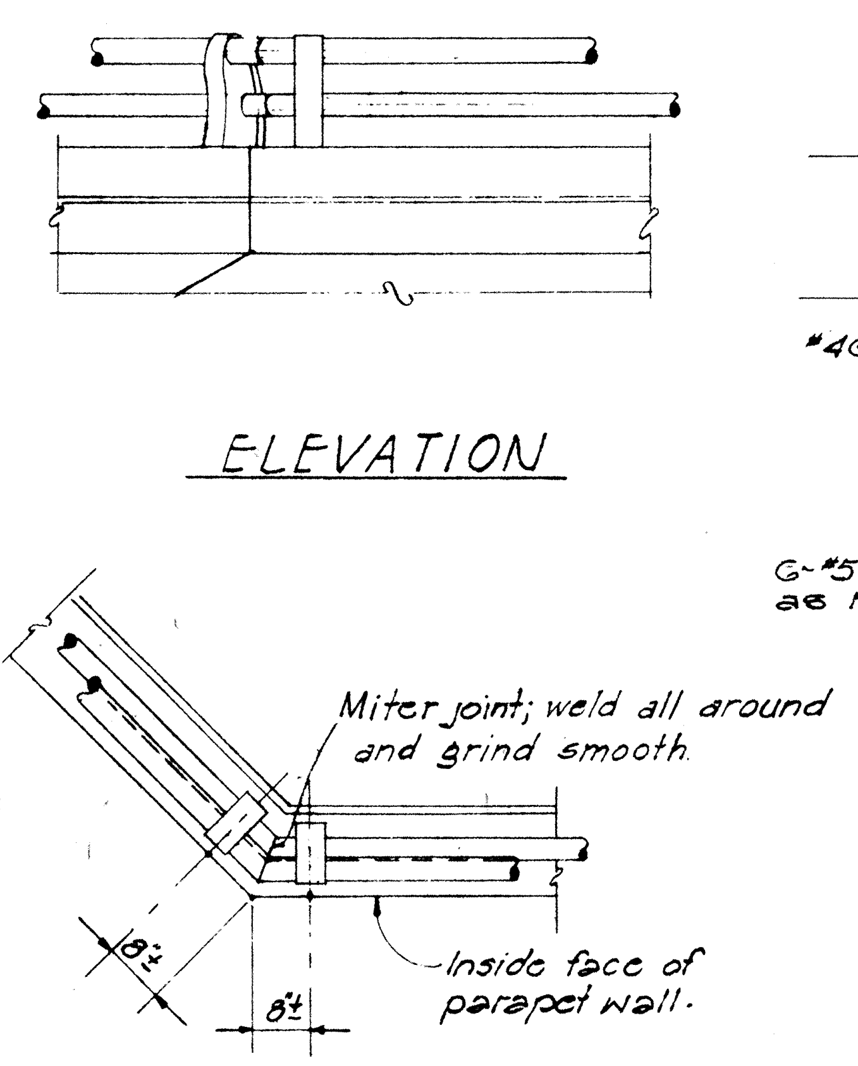
DETAIL "X"

Scale: ¾" = 1'-0"

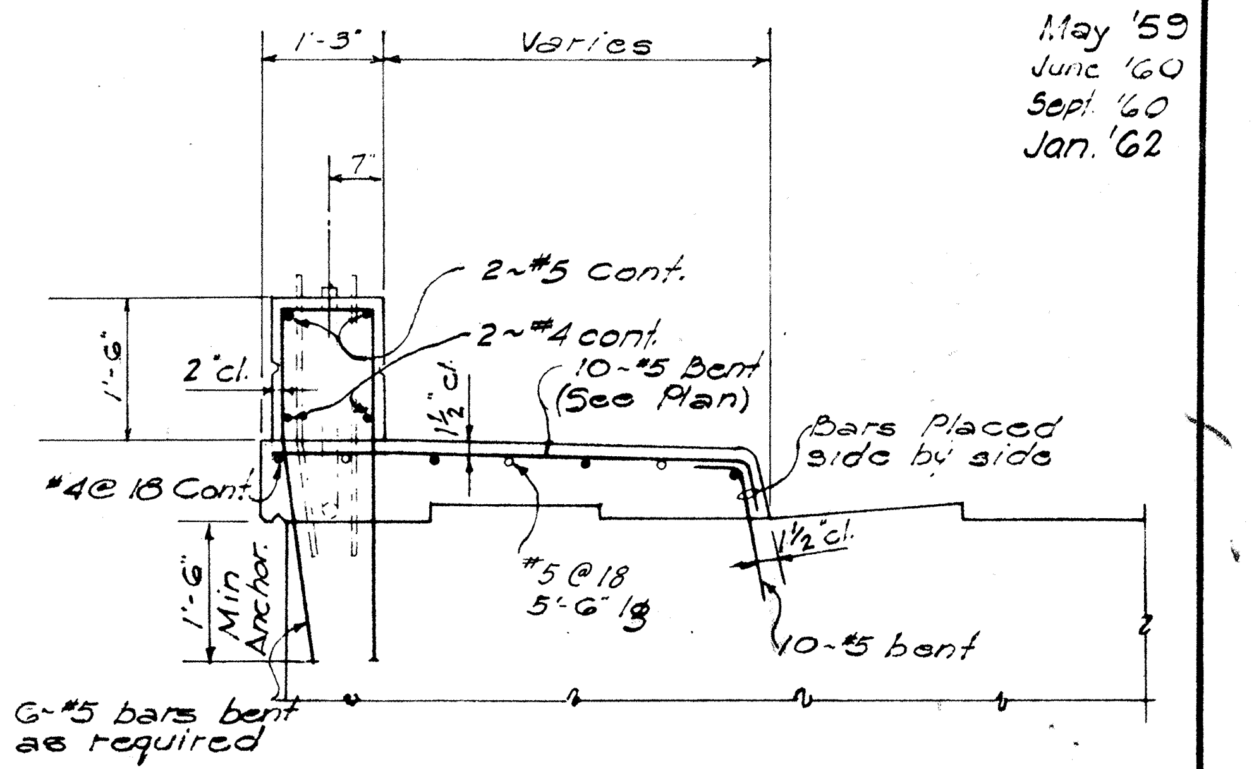

All Draft Angles 3°
3/32 R
1/8 R
4" for top rail
3½" for bot. rail
1"
1/4"

RAIL CAP DETAIL

Scale: 3/8" = 1 in.

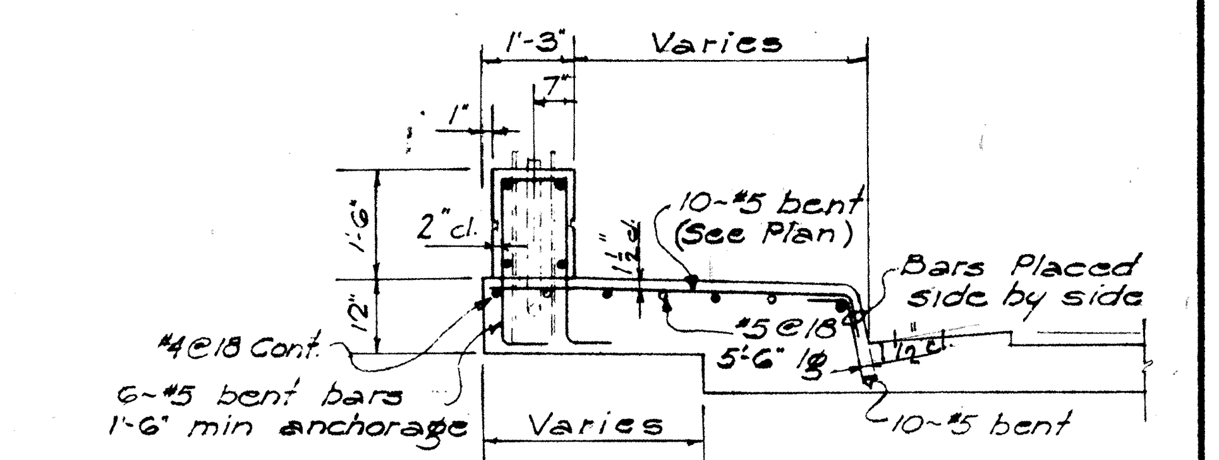

ELEVATION
Miter joint; weld all around and grind smooth.
Inside face of parapet wall.
8"
PLAN

TREATMENT OF RAILING AT SKEWED JOINT


1'-3"
Varies
7"
2-#5 cont.
2-#4 cont.
10-#5 Bent (See Plan)
2" cl.
1'-6"
1½" cl.
Bars Placed side by side
#4 @ 18 Cont.
1'-6" Min. Anchor.
#5 @ 18
5'-6" lg.
10-#5 bent
6-#5 bars bent as required

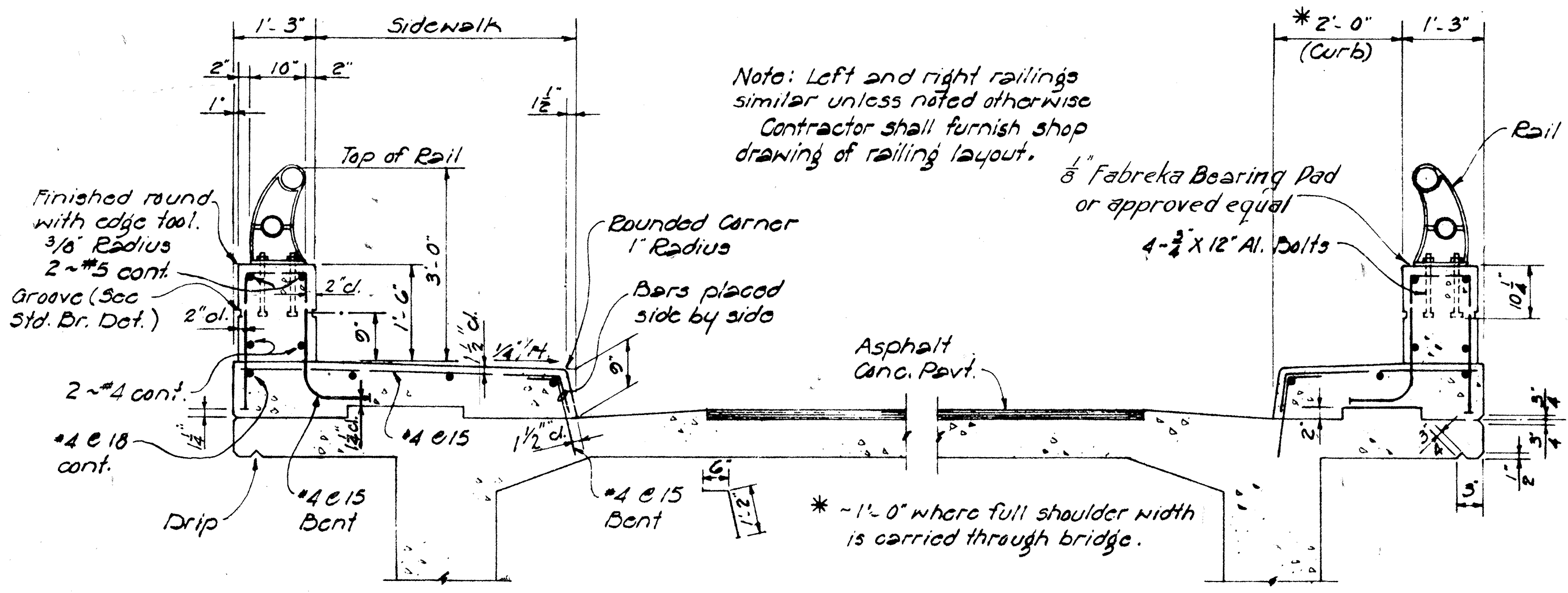
SECTION "X-X"

Scale: ⅜" = 1'-0"


1'-3"
Varies
7"
2" cl.
10-#5 bent (See Plan)
Bars Placed side by side
#5 @ 18
5'-6" lg.
#4 @ 18 Cont.
6-#5 bent bars 1'-6" min anchorage
Varies
10-#5 bent

SECTION "X-X"

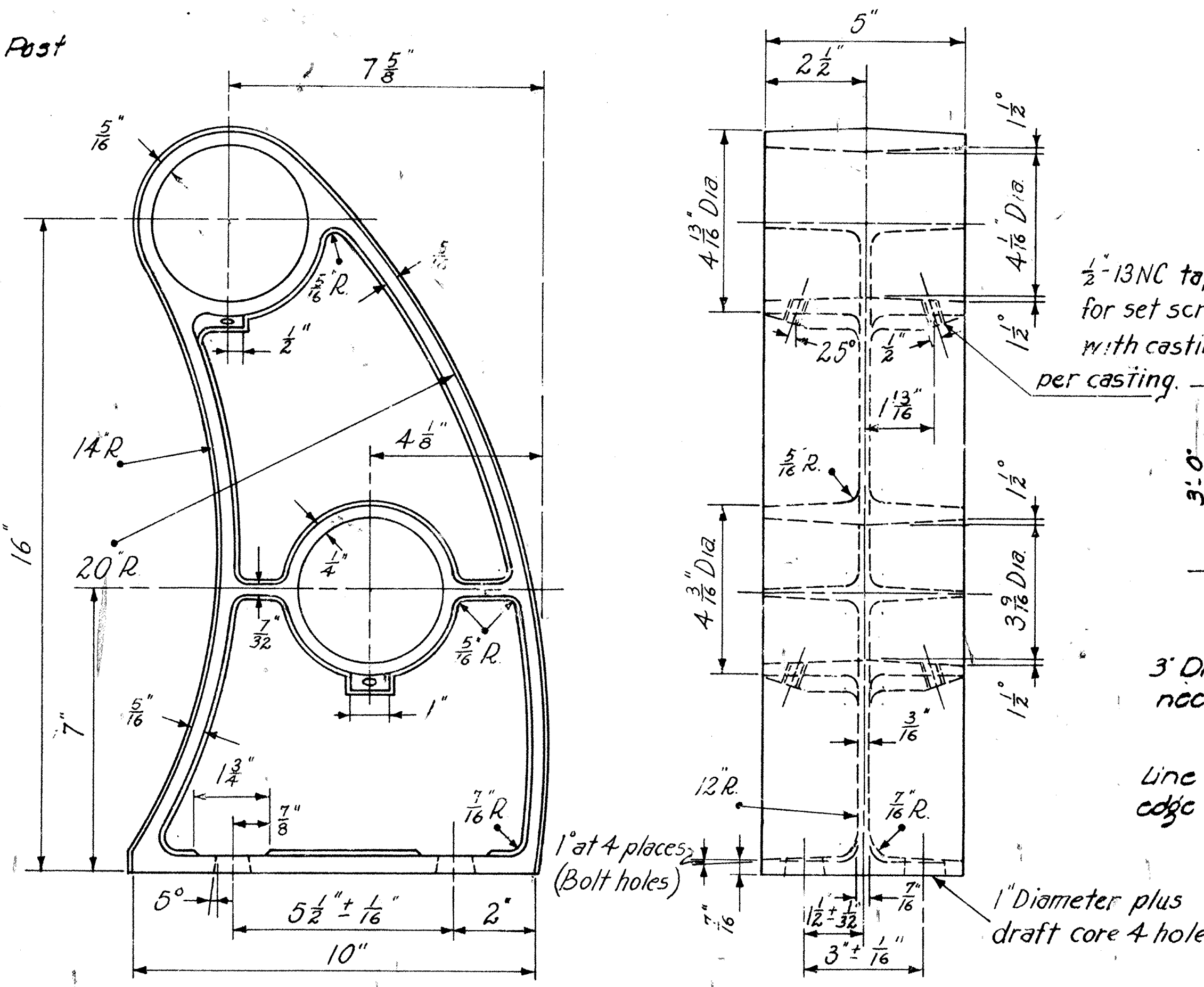
Scale: ⅜" = 1'-0"


1'-3"
Sidewalk
2"
10"
2"
1½"
Top of Rail
Finished round with edge tool. 3/8" Radius
2-#5 cont.
Groove (See Std. Br. Det.)
2" cl.
2-#4 cont.
#4 @ 18 cont.
Drip
#4 @ 15 Bent
#4 @ 15
#4 @ 15 Bent
Rounded Corner 1" Radius
Bars placed side by side
Asphalt Conc. Pavt.
* - 1'-0" where full shoulder width is carried through bridge.
*2'-0" (Curb)
1'-3"
Rail Post
⅛" Fabreka Bearing Pad or approved equal
4-¾" x 12" Al. Bolts

Note: Left and right railings similar unless noted otherwise. Contractor shall furnish shop drawing of railing layout.

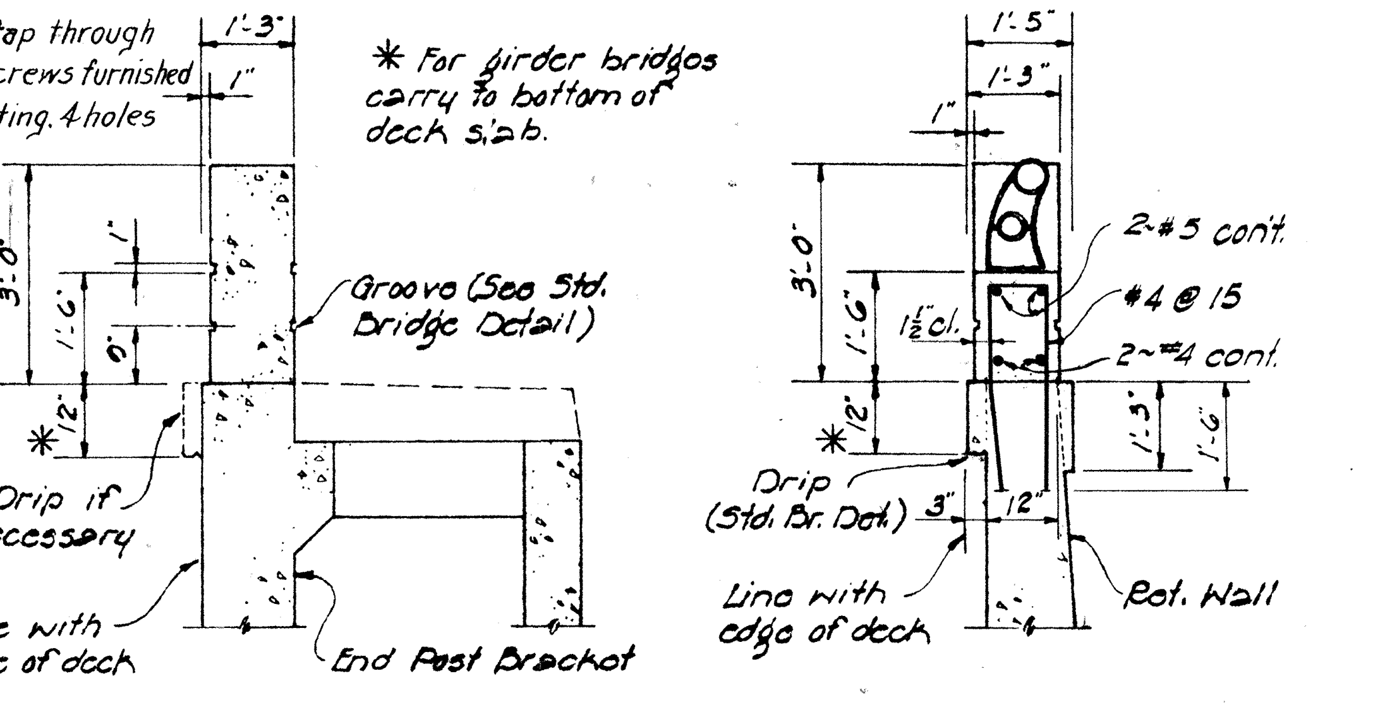
TYPICAL SECTION

Scale - ½" = 1'-0"


7⅝"
5"
2½"
14"R
20"R
16"
7"
5"
5½" ± 1/16"
2"
10"
4⅛"
1" at 4 places (Bolt holes)
1'-13NC tap through for set screws furnished with casting. 4 holes per casting.
4½" Dia
3⅞" Dia
12"R
1" Diameter plus draft core 4 holes
3" ± 1/16"

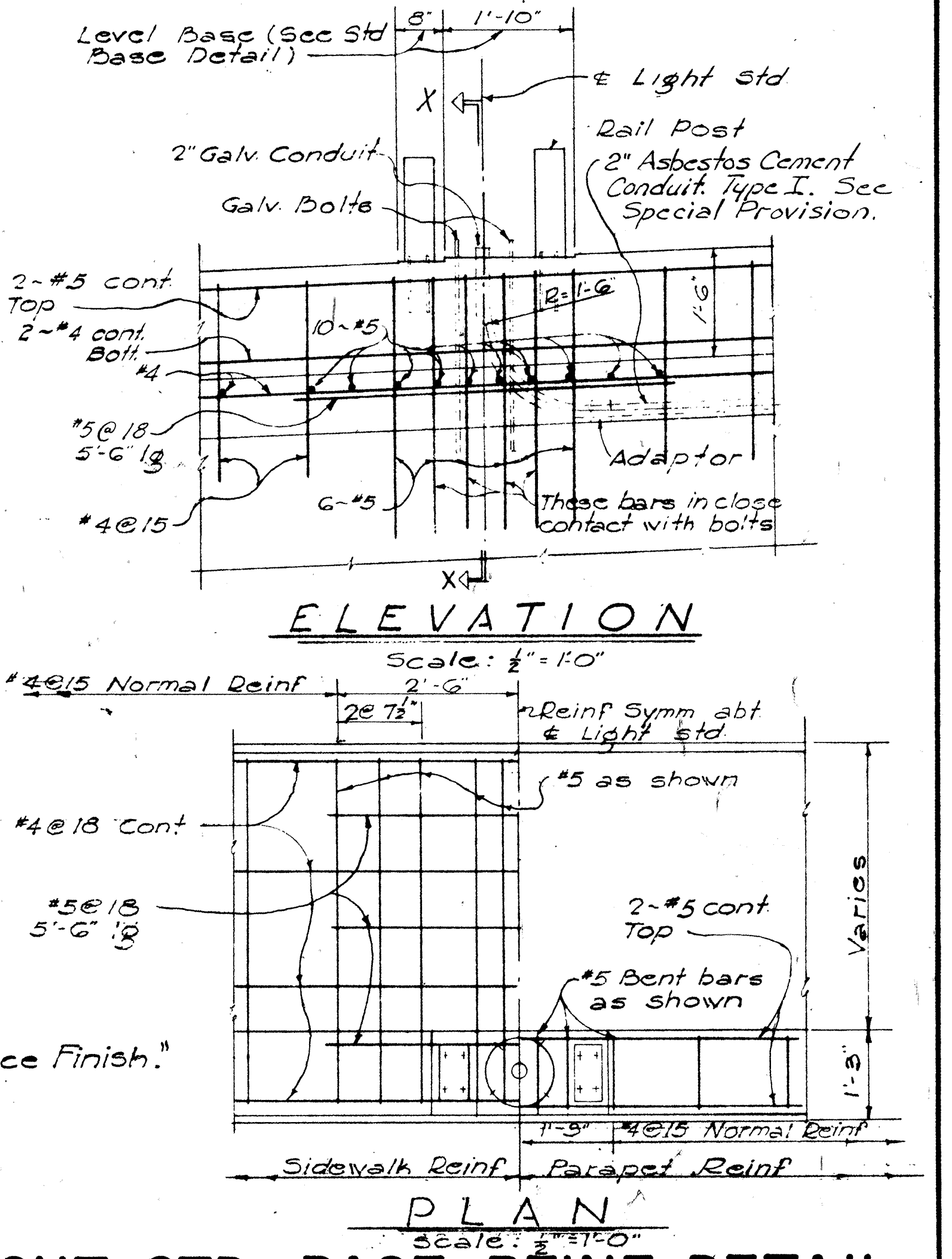
RAIL POST DETAIL

Scale - 3" = 1'-0"

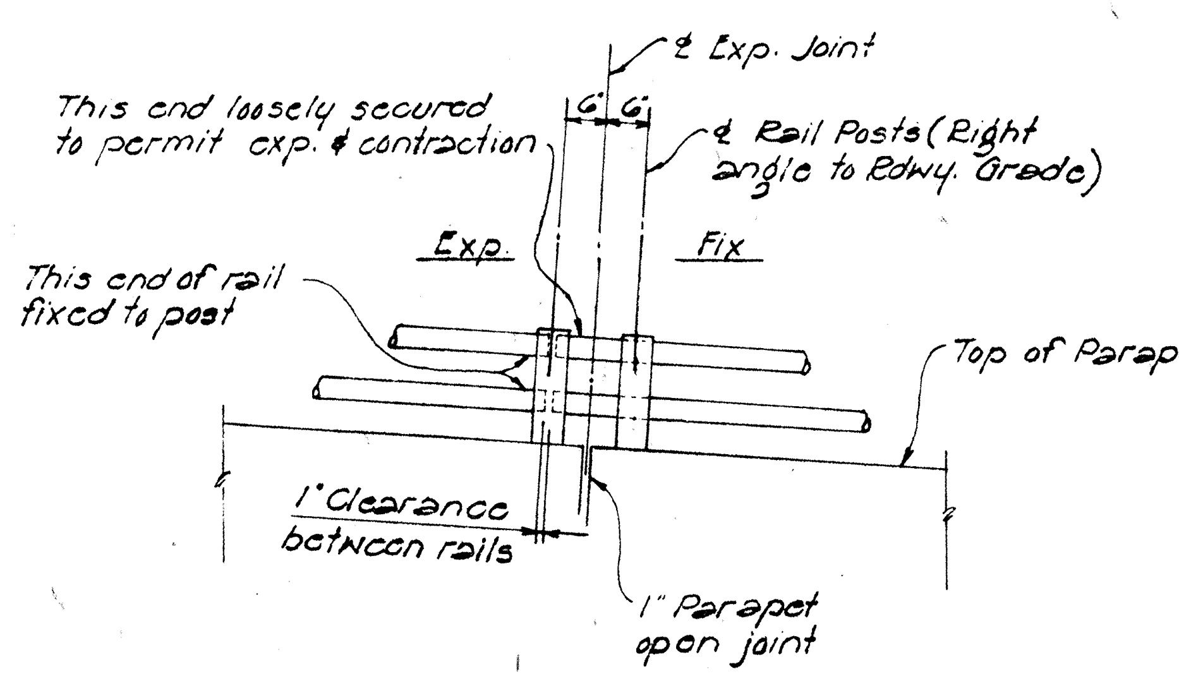

1'-3"
1"
3'-0"
Groove (See Std. Bridge Detail)
3" Drip if necessary
Line with edge of deck
End Post Bracket
* For girder bridges carry to bottom of deck slab.
SEC. A-A
1'-5"
1'-3"
2-#5 cont
#4 @ 15
2-#4 cont.
Drip (Std. Br. Det.)
Line with edge of deck
Ret. Wall
SEC. B-B

SECTIONS

Scale - ⅜" = 1'-0"

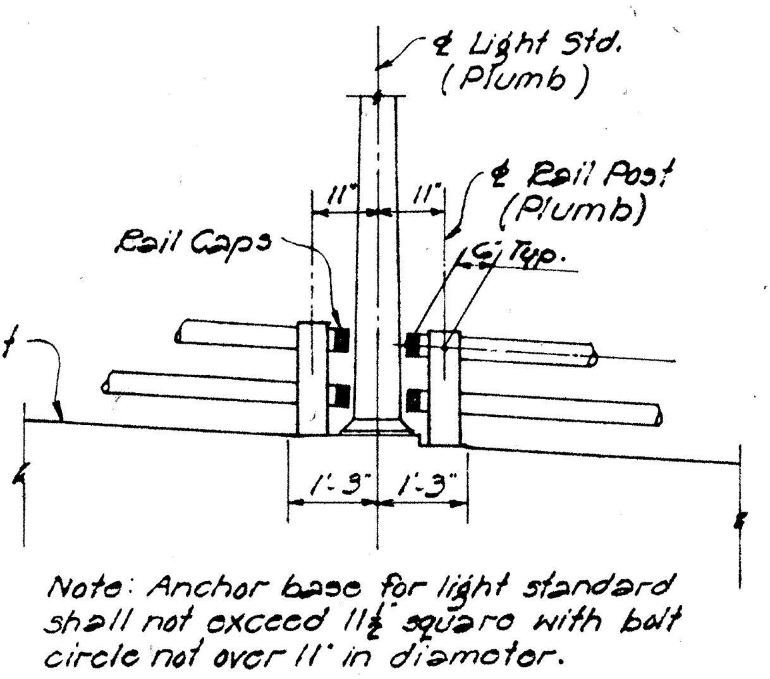

Level Base (See Std Base Detail)
1'-10"
℄ Light std
Rail Post
2" Galv Conduit
2" Asbestos Cement Conduit. Type I. Sec. Special Provision.
Galv. Bolts
2-#5 cont Top
2-#4 cont. Bott.
#5 @ 18
5'-6" lg.
#4 @ 15
6-#5
Adaptor
These bars in close contact with bolts
ELEVATION
Scale: ½" = 1'-0"
#4 @ 15 Normal Reinf.
2'-6"
Reinf Symm abt ℄ Light std
#5 as shown
#4 @ 18 Cont.
#5 @ 18
5'-6" lg.
2-#5 cont Top
#5 Bent bars as shown
Varies
#4 @ 15 Normal Reinf.
Sidewalk Reinf.
Parapet Reinf.
PLAN
Scale: ½" = 1'-0"

LIGHT STD. BASE REINF. DETAIL


℄ Exp. Joint
This end loosely secured to permit exp. & contraction
℄ Rail Posts (Right angle to Rdwy. Grade)
Exp.
Fix
This end of rail fixed to post
Top of Parapet
1" Clearance between rails
1" Parapet open joint

TREATMENT OF RAILING AT EXP. JOINT

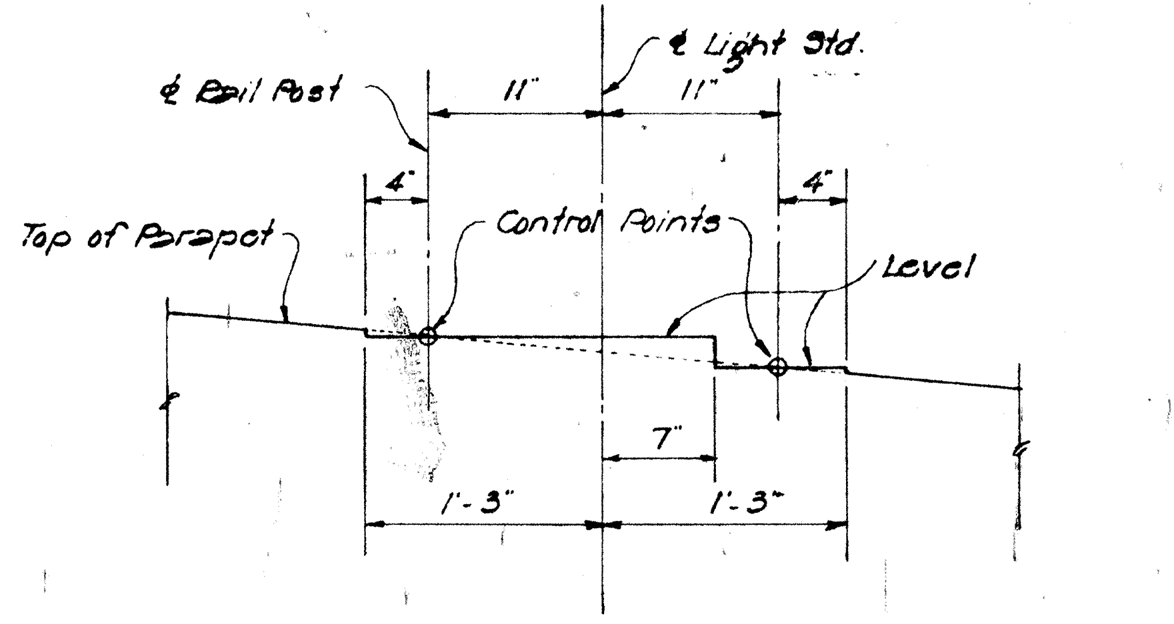
Scale - ⅜" = 1'-0"


℄ Light Std. (Plumb)
℄ Rail Post (Plumb)
Rail Caps
Cap.
1'-3"
1'-3"

Note: Anchor base for light standard shall not exceed 11½" square with bolt circle not over 11" in diameter.

TREATMENT OF RAILING AT LIGHT STD.

Scale - ⅜" = 1'-0"


℄ Rail Post
℄ Light Std.
11"
11"
4"
4"
Control Points
Level
Top of Parapet
7"
1'-3"
1'-3"

LIGHT STD. BASE DETAIL

Scale - 1" = 1'-0"

GENERAL NOTE

Except where detailed otherwise in the plans, all details on this sheet govern.

Aluminum railing concrete parapet & end post to receive "Class 2 Surface Finish."

SPECIFICATION FOR ALUMINUM RAILING

ITEM	DESCRIPTION	ALLOY	UNIT WT.
Top Rail	Al. Alloy Drawn Or Extruded Tube 4" o.d. x ⅛" thick wall.	6061 - T6	1.79 #/Ft.
Bot. Rail	Al. Alloy Drawn Or Extruded Tube 3½" o.d. x ⅛" thick wall.	6061 - T6	1.56 #/Ft.
*Rail Post	Permanent Mold Casting See Rail Post Detail	Post A.356 - T6 Set Sc. 2024 - T4	16.0 #/Ea.
Rail Cap	See Rail Cap Detail	Cap 356 - T6	Top - .415 #/Ea. Bot. - .340 #/Ea.
Bolts	See Anchor Bolt Detail Provide Hexagon Nut and Plain Washer	Bolt 2024 - T4 Nut 6061 - T6 Wash. 2024 - T4	——

* Rail Post Finish: Front, top and rear faces of post shall receive a standard scratch brush finish, to be approved by the Engineer.

APPROVED DATE Aug. 26, 1959

STATE HIGHWAY ENGINEER

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

STANDARD DETAILS

ALUMINUM RAILING

SCALE AS NOTED

SHEET No. S-3 OF 5 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY W.E. Bartels	1-58
	DRAWN BY B. Tamura	
	TRACED BY	
NOTE BOOK No.	QUANTITIES BY	
	QUANTITIES CHECKED BY	
	CHECKED BY	

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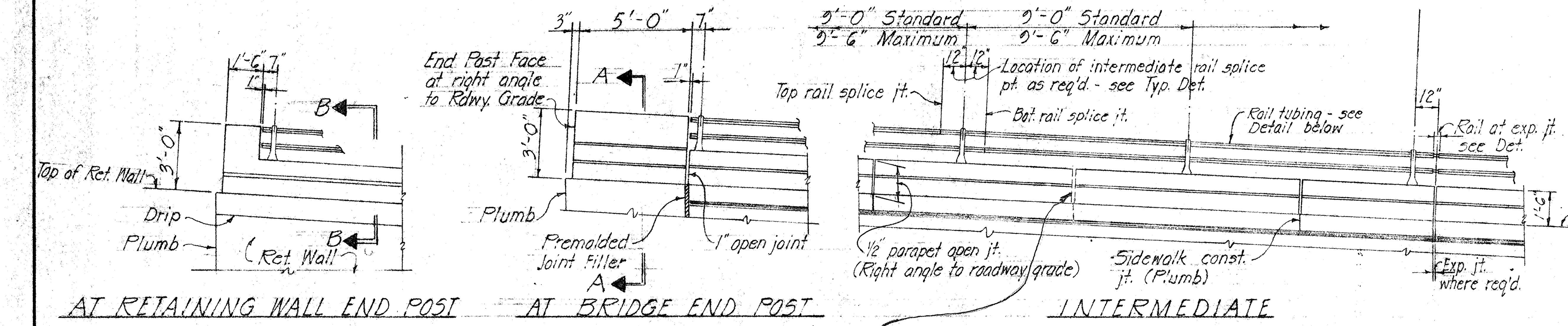
PRINTED ON DIEPO 1000H CLEARPRINT

"WHAT'S THIS, FREDDIE ?"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(4)	1963	182	217

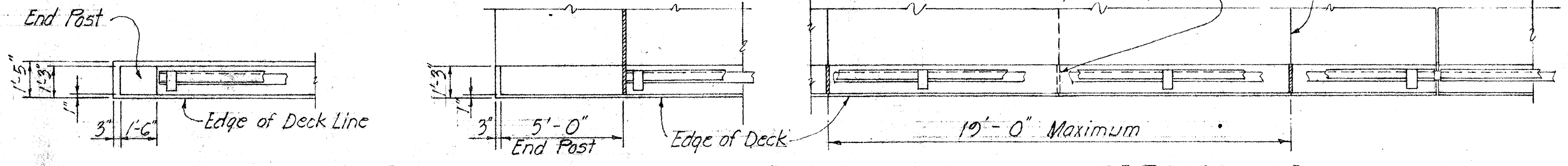

3'
5'-0"
1'-7"
3'-0"
Top of Ret. Wall
Drip
Plumb
Ret. Wall
B
End Post Face at right angle to Rdwy. Grade
A
Plumb
Premolded Joint Filler
1" open joint
9'-0" Standard
9'-6" Maximum
Location of intermediate rail splice pt. as req'd. - see Typ. Det.
Top rail splice jt.
Bot. rail splice jt.
Rail tubing - see Detail below
Rail at exp. jt. see Det.
1/2" parapet open jt. (Right angle to roadway grade)
Sidewalk const. jt. (Plumb)
Top of sidewalk or curb
Exp. jt. where req'd.

AT RETAINING WALL END POST   AT BRIDGE END POST   INTERMEDIATE

EXTERIOR RAILING ELEVATION

Scale: 1/4" = 1'-0"

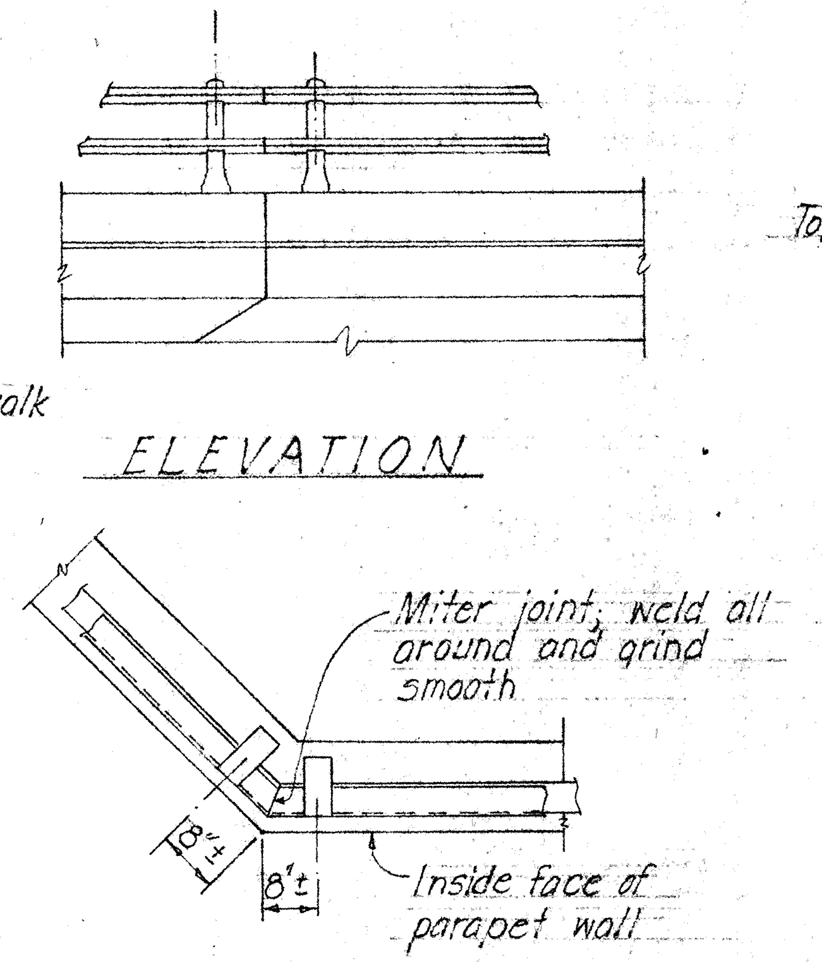
Additional joints required in parapet near piers. No. of jts. shall be determined by engineer. For parapets on retaining walls, jts. shall be located at all ret. wall contraction and expansion joints.


End Post
1'-5"
1'-3"
3'
1'-6"
Edge of Deck Line
3'
5'-0"
End Post
Edge of Deck
19'-0" Maximum
Sidewalk const. jt. - see Std. Br. Det.

AT RETAINING WALL END POST   AT BRIDGE END POST   INTERMEDIATE

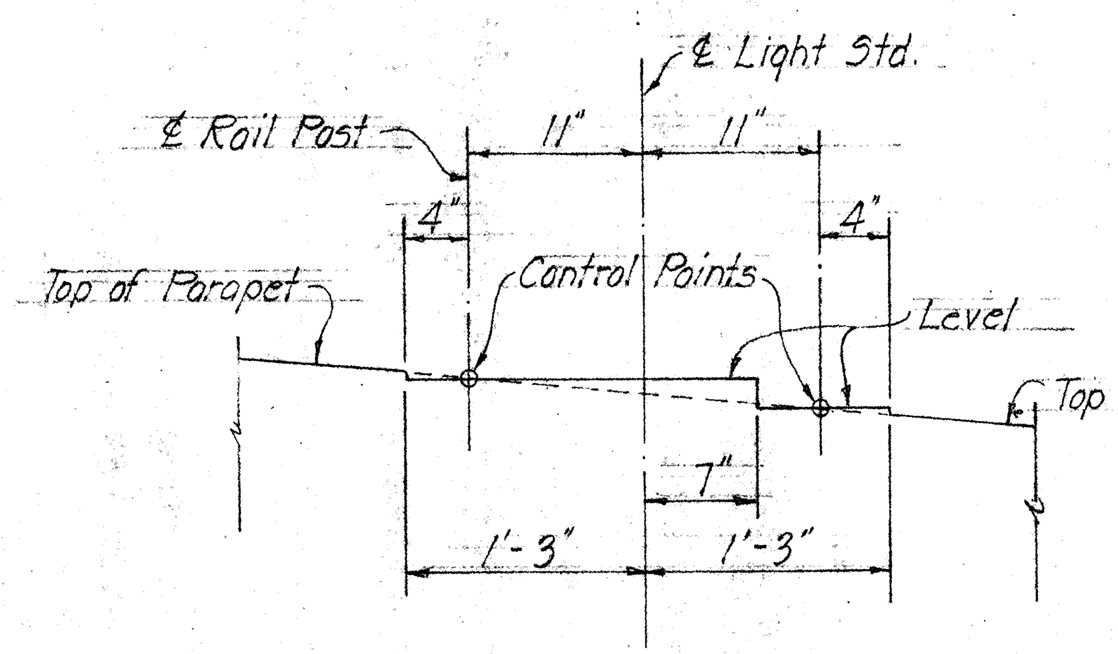
PLAN OF RAILING

Scale: 1/4" = 1'-0"


ELEVATION
Miter joint, weld all around and grind smooth
Inside face of parapet wall
8"±

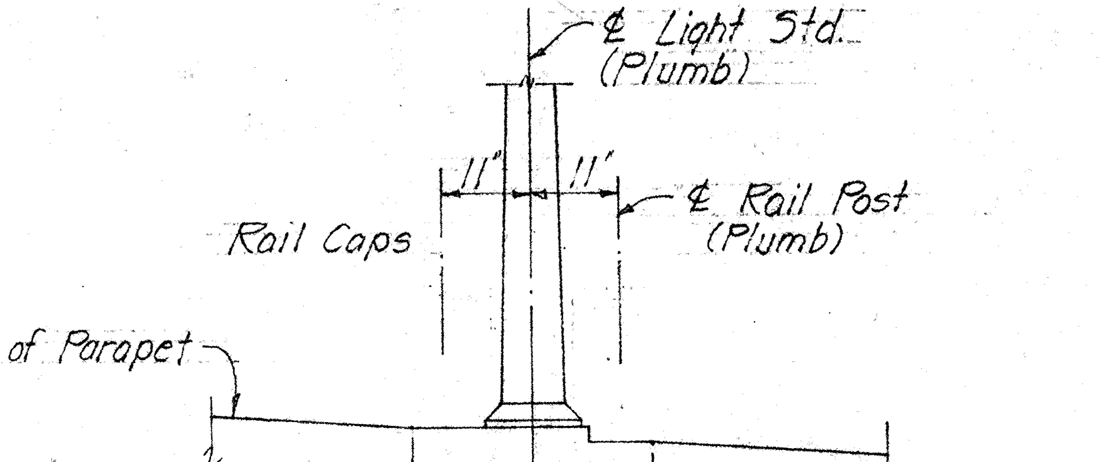
PLAN

TREATMENT OF RAILING AT SKEWED ENDS


℄ Light Std.
℄ Rail Post
11"
11"
4"
4"
Top of Parapet
Control Points
Level
Top of Parapet
7"
1'-3"
1'-3"

LIGHT STD. BASE DETAIL

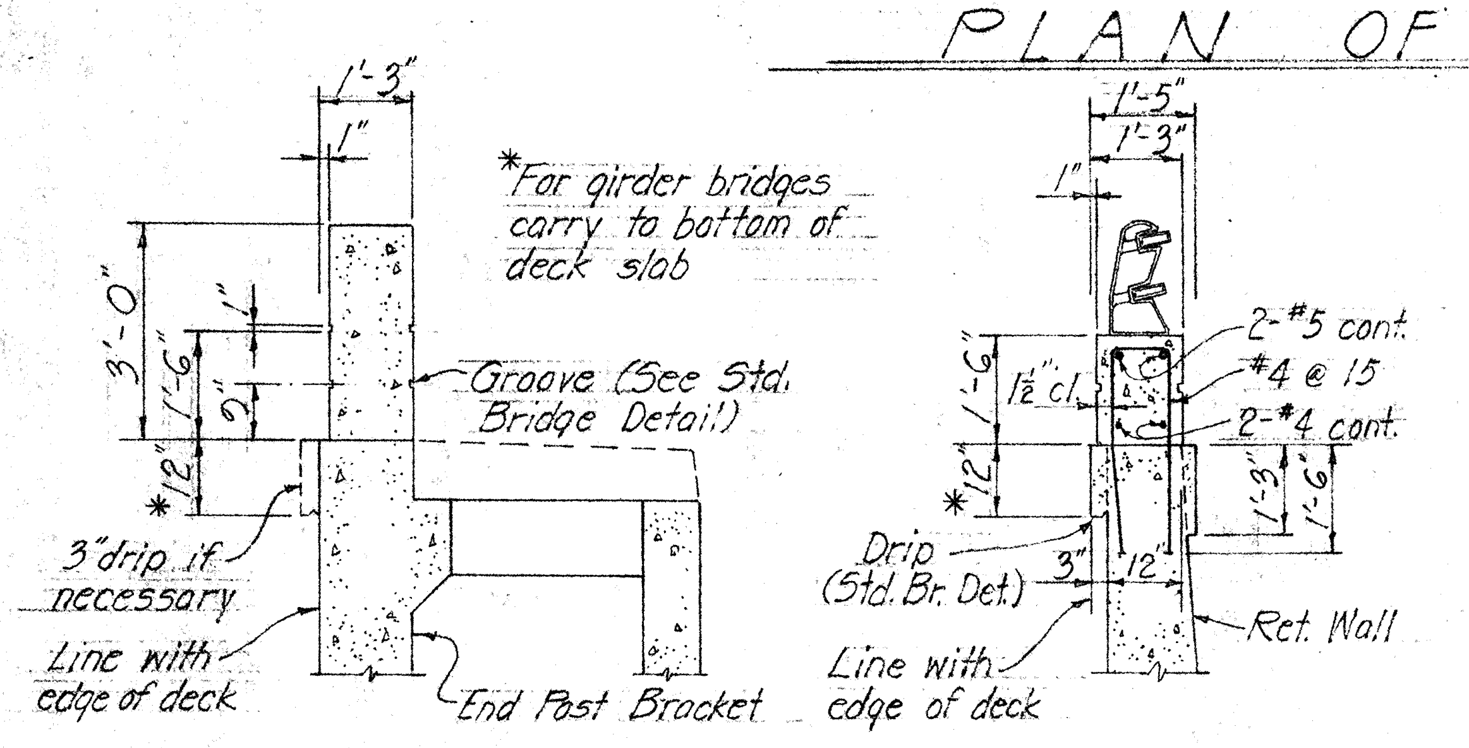
Scale: 1" = 1'-0"


℄ Light Std. (Plumb)
11"
11"
Rail Caps
℄ Rail Post (Plumb)
1'-3"
1'-3"

Note: Anchor base for light standard shall not exceed 11½" square with bolt circle not over 11" in diameter.

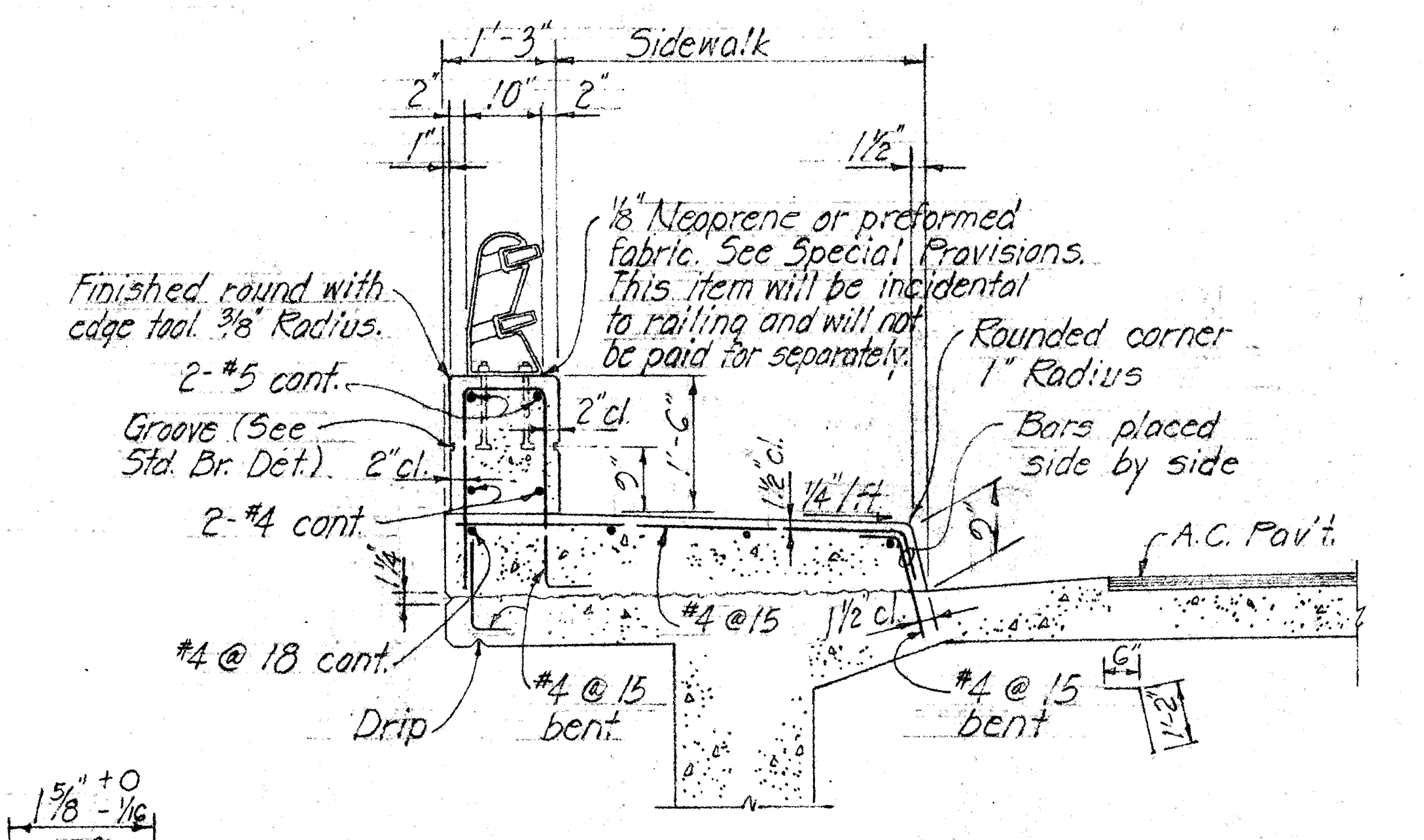
TREATMENT OF RAILING AT LIGHT STD.

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


1'-3"
*For girder bridges carry to bottom of deck slab
3'-0"
Groove (See Std. Bridge Detail)
3" drip if necessary
Line with edge of deck
End Post Bracket
1'-5"
1'-3"
2-#5 cont.
#4 @ 15
2-#4 cont.
Drip (Std. Br. Det.)
Line with edge of deck
Ret. Wall

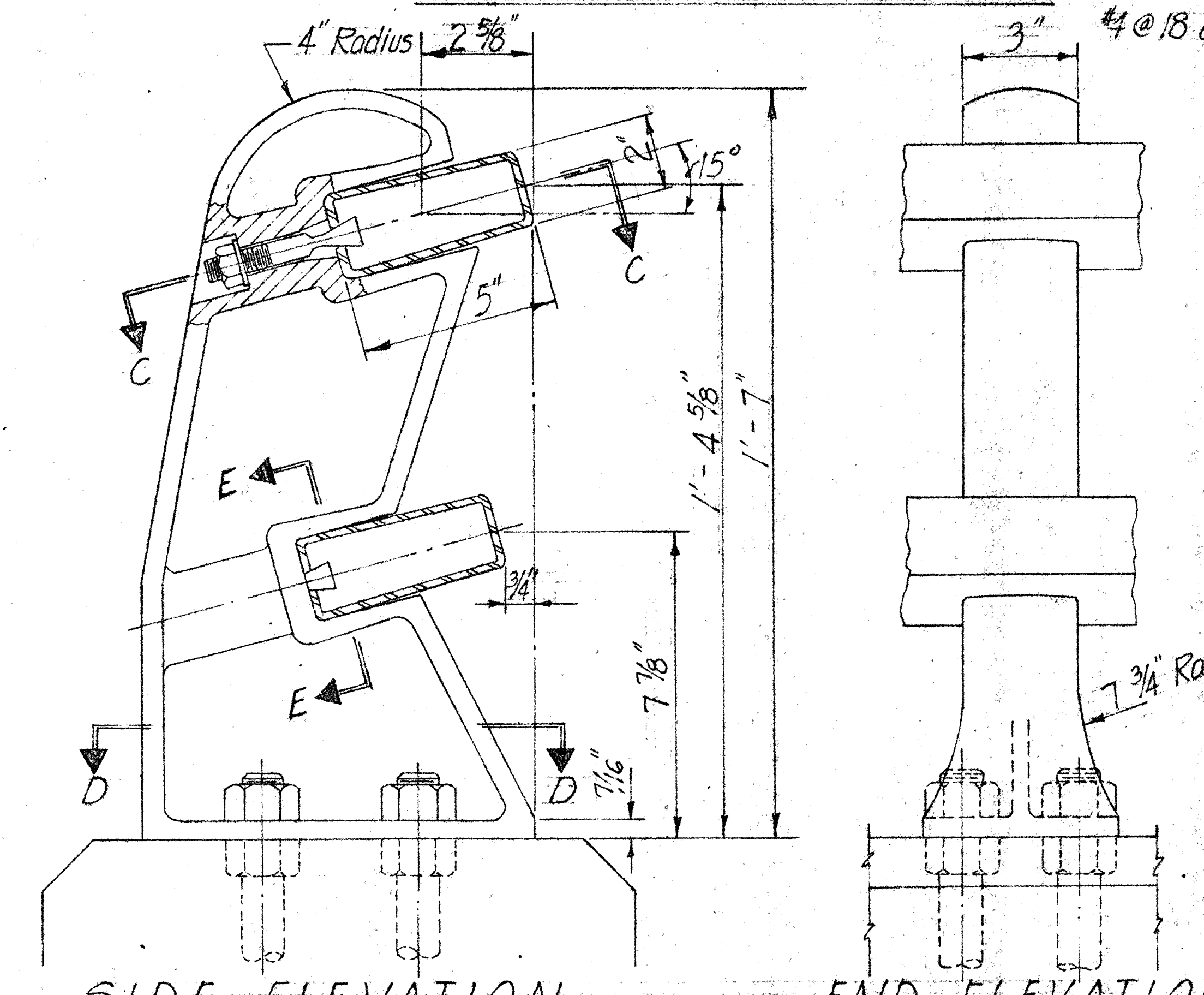
SECTION A-A   SECTION B-B

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


1'-3"
Sidewalk
1/8" Neoprene or preformed fabric. See Special Provisions. This item will be incidental to railing and will not be paid for separately.
Finished round with edge tool 3/8" Radius.
Rounded corner 1" Radius
2-#5 cont.
Groove (See Std. Br. Det.)
Bars placed side by side
2-#4 cont.
A.C. Pav't.
#4 @ 18 cont.
#4 @ 15
Drip
#4 @ 15 bent
#4 @ 15 bent

TYPICAL SECTION

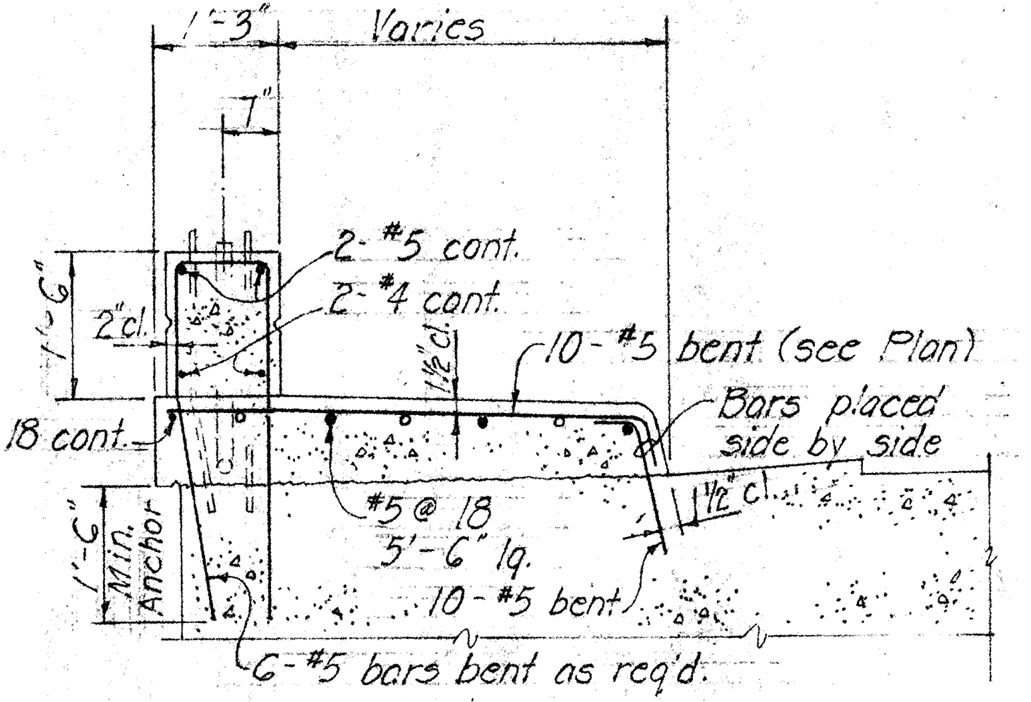
Scale: 1/2" = 1'-0"


4" Radius
2 5/8"
15°
C
C
5"
E
E
1'-4 5/16"
1'-7"
7/8"
3/4
D
D
3"
7 3/4 Radius

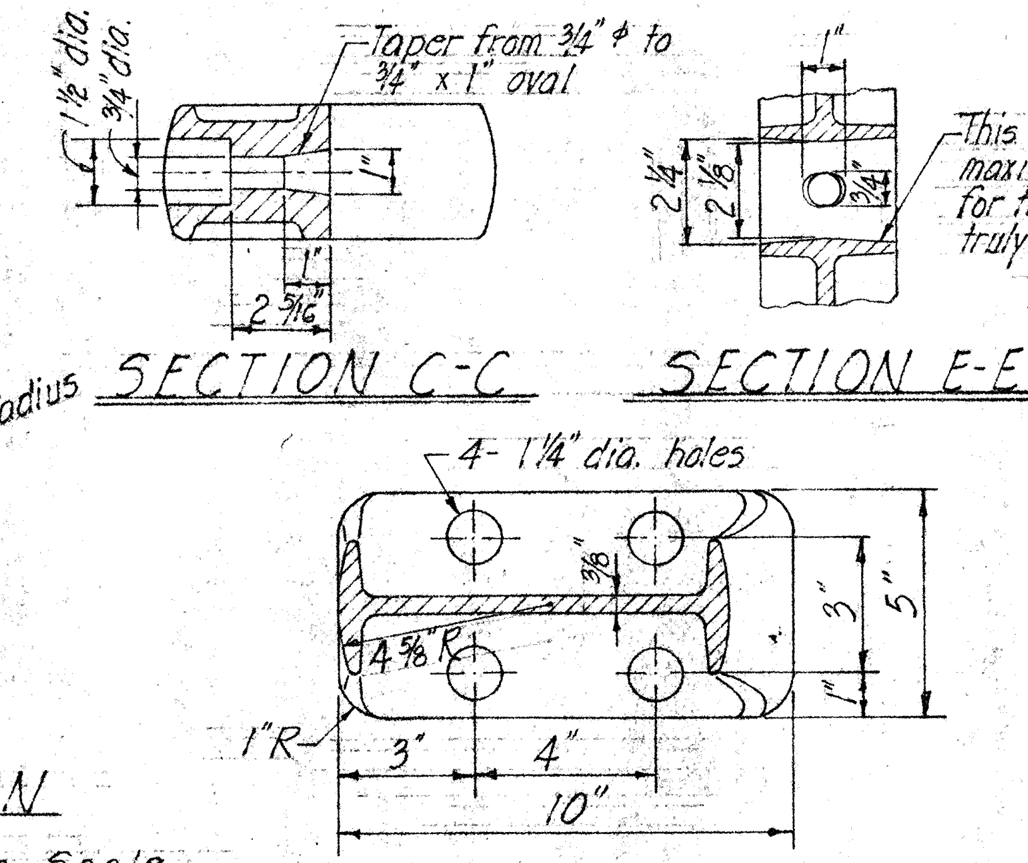
SIDE ELEVATION   END ELEVATION

TYPICAL RAIL POST DETAIL

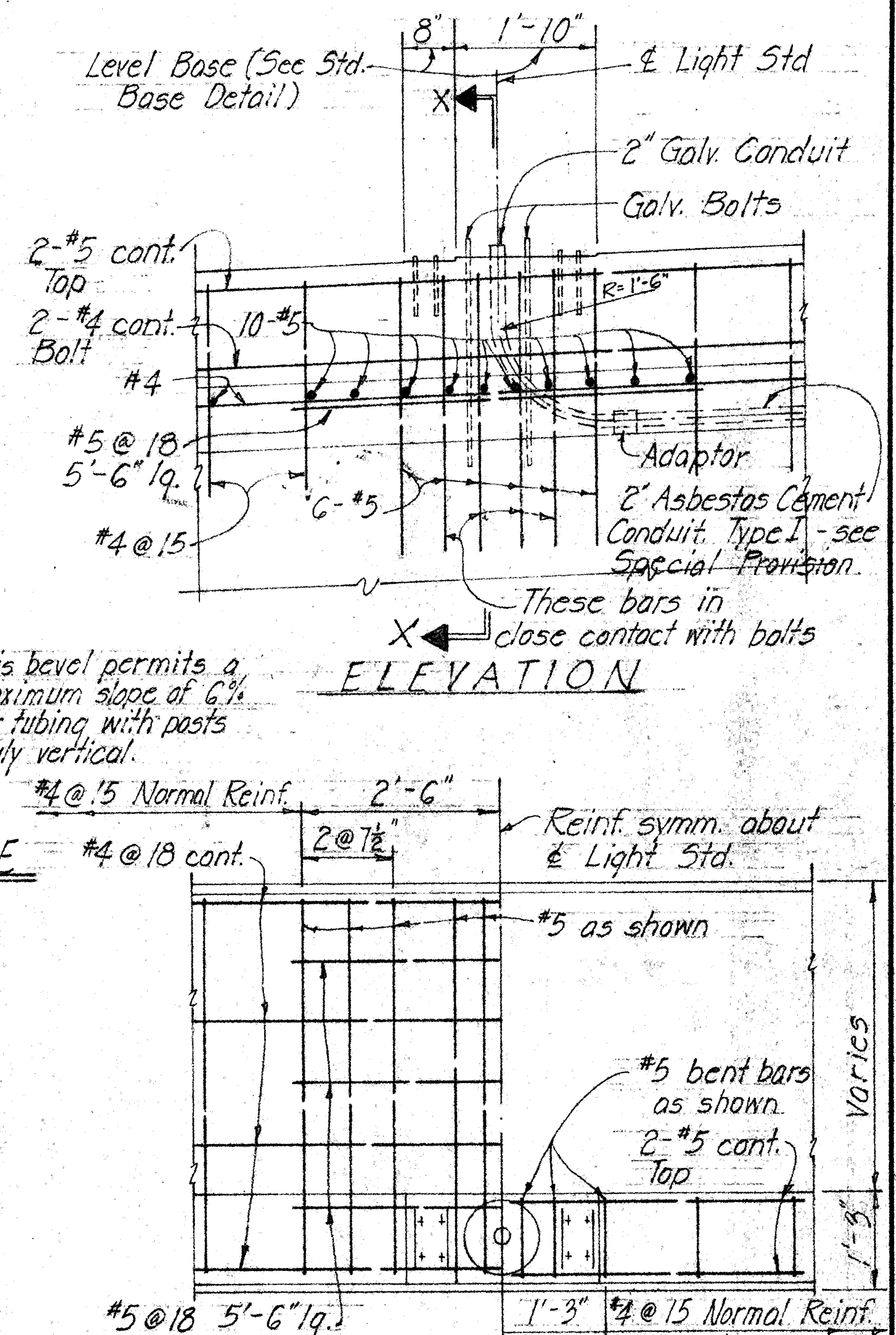
No Scale


1'-3"
Varies
7"
2-#5 cont.
2-#4 cont.
10-#5 bent (see Plan)
Bars placed side by side
#4 @ 18 cont.
#5 @ 18 5'-6" lg.
10-#5 bent
Min. Anchor
C-#5 bars bent as req'd.

SECTION X-X


Taper from 3/4" ⌀ to 3/8" × 1" oval
This bevel permits a maximum slope of 6% for tubing with posts truly vertical.
SECTION C-C
SECTION E-E
4-1 1/4" dia. holes
4 3/4" R
1"R
3"
4"
10"
5"

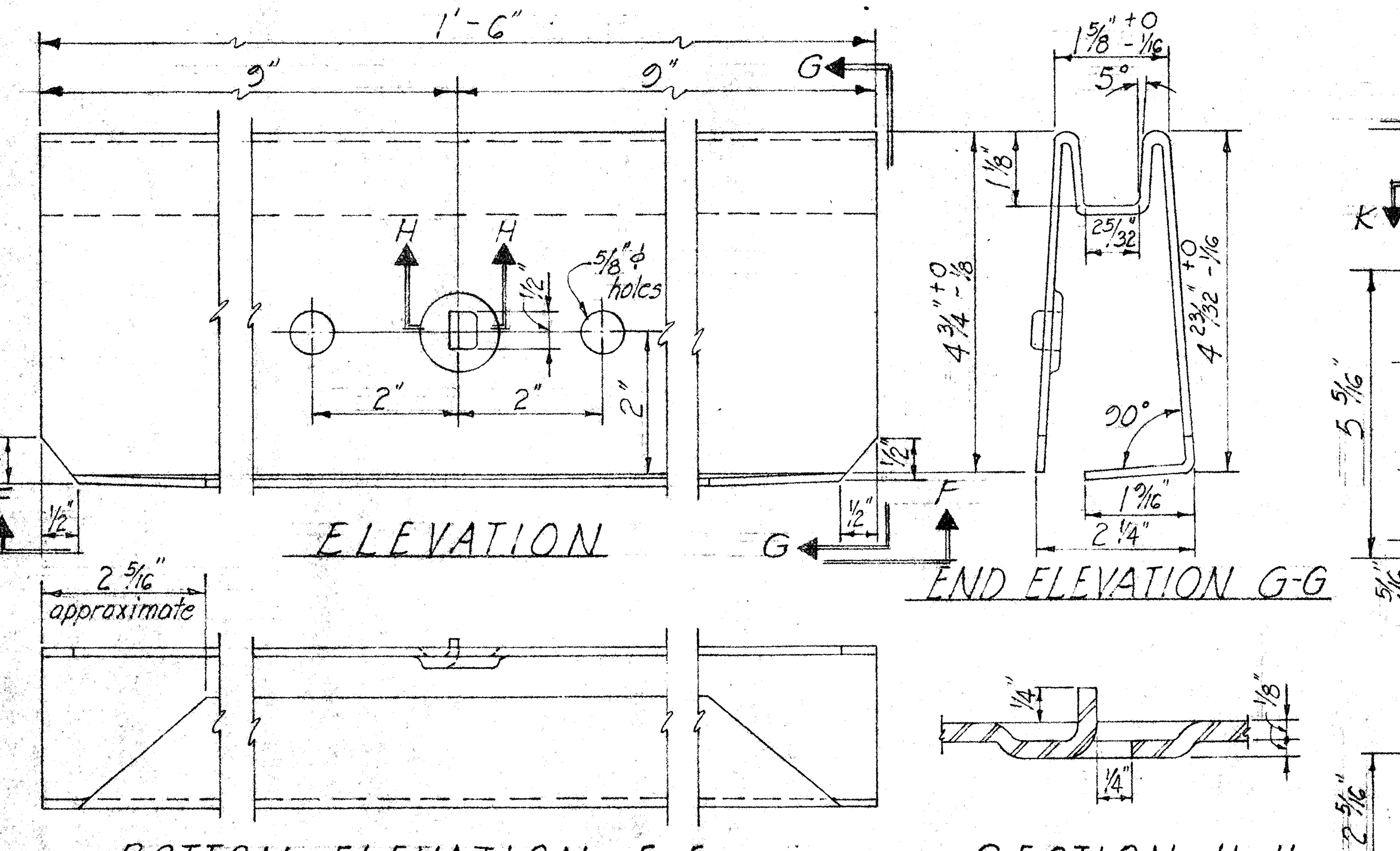
SECTION D-D


8"
1'-10"
℄ Light Std
Level Base (See Std. Base Detail)
X
2" Galv. Conduit
Galv. Bolts
2-#5 cont. Top
2-#4 cont. Bot.
10-#5
#4
#5 @ 18 5'-6" lg.
C-#5
#4 @ 15
Adaptor
2" Asbestos Cement Conduit, Type I - see Special Provision.
These bars in close contact with bolts
X
ELEVATION
#4 @ 15 Normal Reinf.
2'-6"
#4 @ 18 cont.
Reinf. symm. about ℄ Light Std.
#5 as shown
#5 bent bars as shown.
2-#5 cont. Top
Varies
#5 @ 18 5'-6" lg.
Sidewalk Reinf.
1'-3"
#4 @ 15 Normal Reinf.
Parapet Reinf.

PLAN

LIGHT STD. BASE REINF. DETAIL

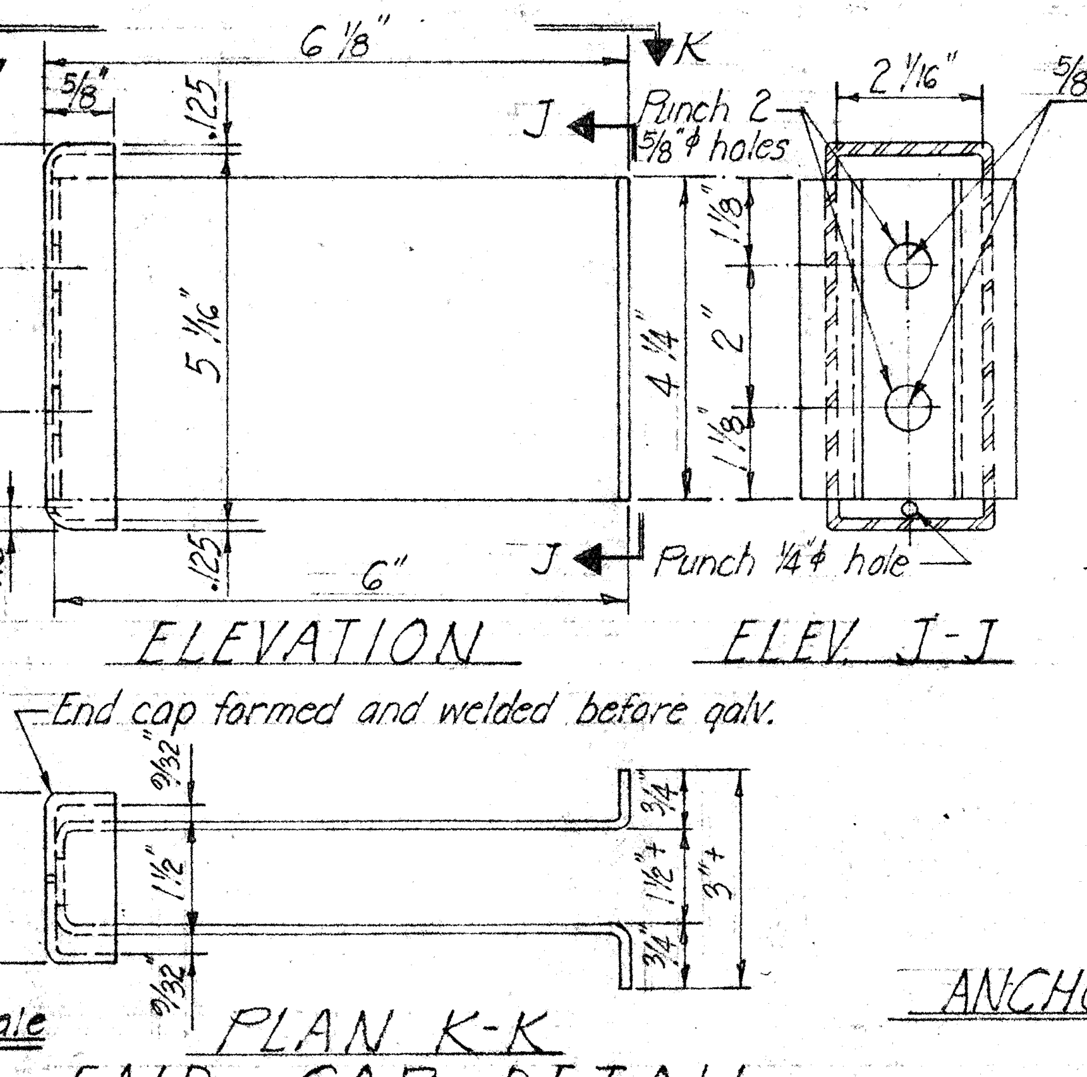
Scale: 1/2" = 1'-0"


1'-6"
9"
9"
G
H
H
5/8" ⌀ holes
2"
2"
F
F
G
ELEVATION
2 5/16" approximate
END ELEVATION G-G
1 9/16" +0 -1/16
5"
90°
2 1/4"
SECTION H-H

BOTTOM ELEVATION F-F

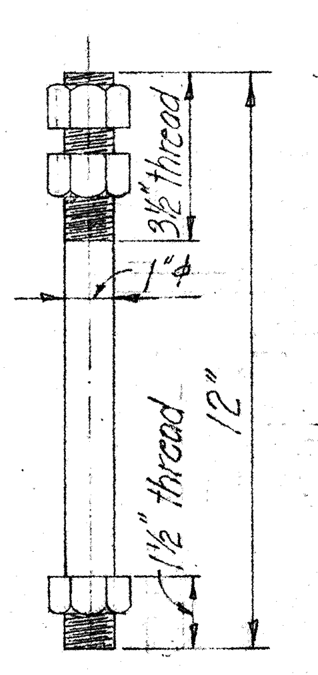
TYPICAL RAIL SPLICE SECTION DETAIL

No Scale


K
K
6 1/8"
Punch 2-5/8" ⌀ holes
J
J
Punch 1/4" ⌀ hole
5 5/16"
5 1/16"
6"
ELEVATION
ELEV. J-J
End cap formed and welded before galv.
PLAN K-K

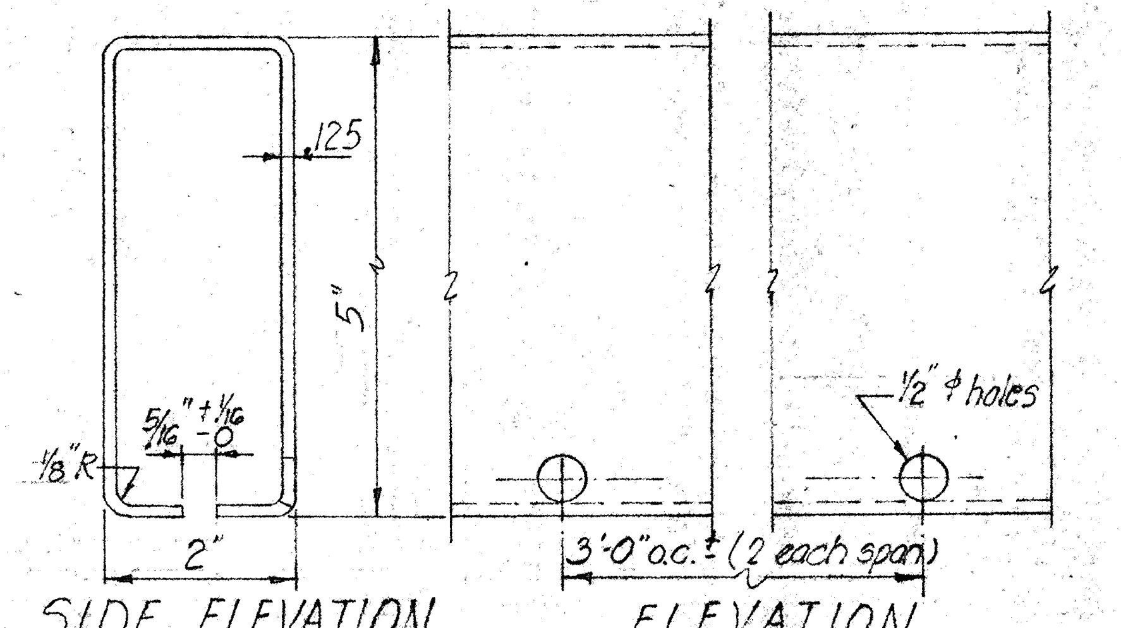
END CAP DETAIL

No Scale

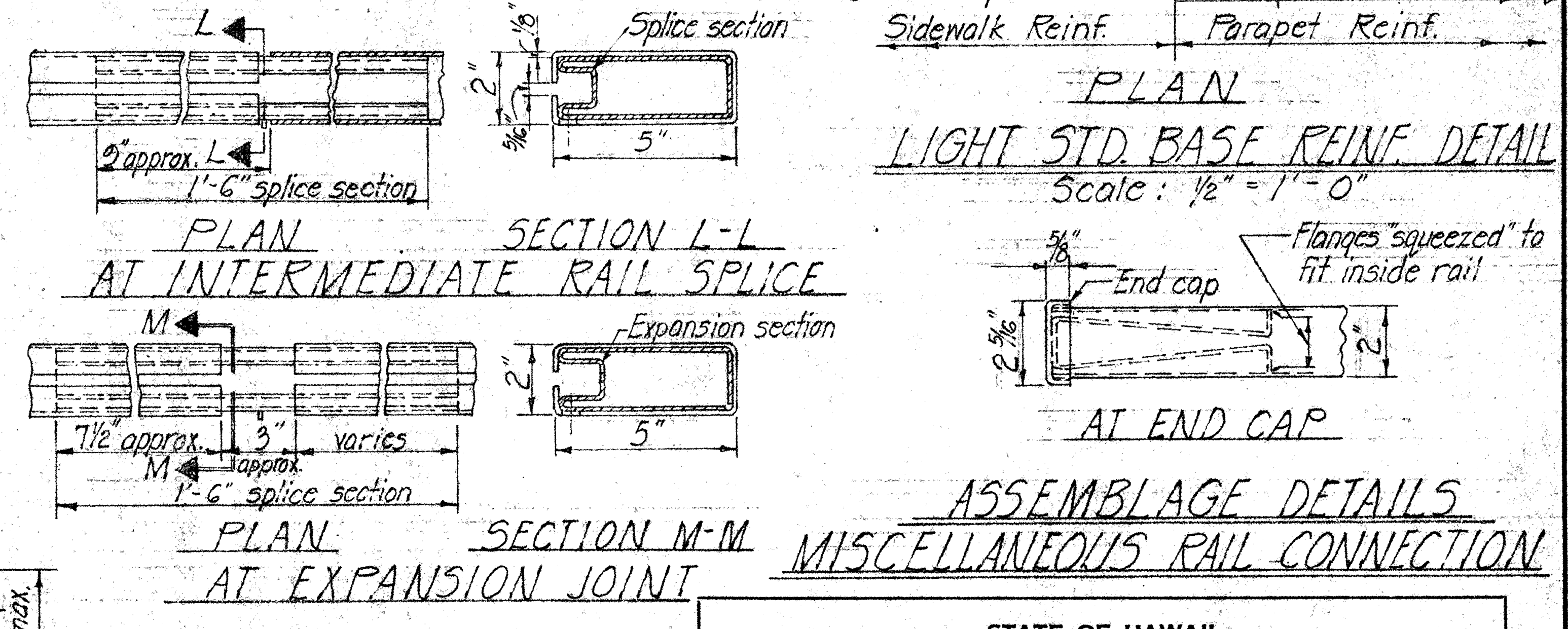

3/4" thread
1 1/4"
12"
1/2" thread

ANCHOR BOLT DETAIL

Scale: 3" = 1'-0"

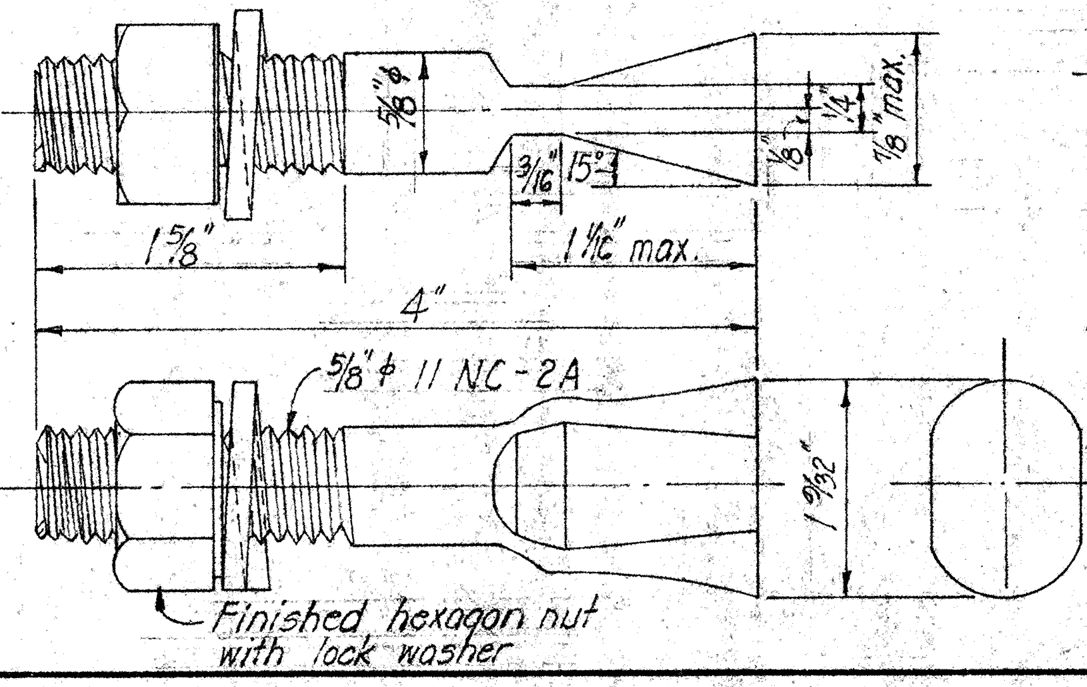

.125
5"
2"
1/2" ⌀ holes
3'-0" c.c. (2 each span)
SIDE ELEVATION
ELEVATION

TYPICAL RAIL TUBING DETAIL


L
L
Splice section
5"
2"
5" approx.
1'-6" splice section
PLAN
SECTION L-L
AT INTERMEDIATE RAIL SPLICE
M
M
Expansion section
7 1/2" approx.
3" approx.
varies
1'-6" splice section
5"
PLAN
SECTION M-M
AT EXPANSION JOINT
End cap
Flanges "squeezed" to fit inside rail
AT END CAP

ASSEMBLAGE DETAILS

MISCELLANEOUS RAIL CONNECTION


1 5/8"
1 1/4" max.
4"
5/8" ⌀ 11 NC-2A
1 5/32"
Finished hexagon nut with lock washer

BRIDGE RAILING WEDGE BOLT

No Scale

SPECIFICATIONS For STEEL RAILING

ITEM	DESCRIPTION	GALVANIZE
Post	Malleable Iron Castings ASTM A-47, Grade 35018	ASTM A-153
Railing	Tubing 5"×2"×1/8" ASTM A-245, Grade C	ASTM A-123
Anchor Bolts & Nuts	ASTM A-307	ASTM A-153
Wedge Bolts	ASTM A-307	ASTM A-153

ORIGINAL PLAN	SURVEY PLOTTED BY
	DRAWN BY R. Young
	TRACED BY
NOTE BOOK	DESIGNED BY
	QUANTITIES BY
No.	CHECKED BY J.T.O. P.Y.

DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

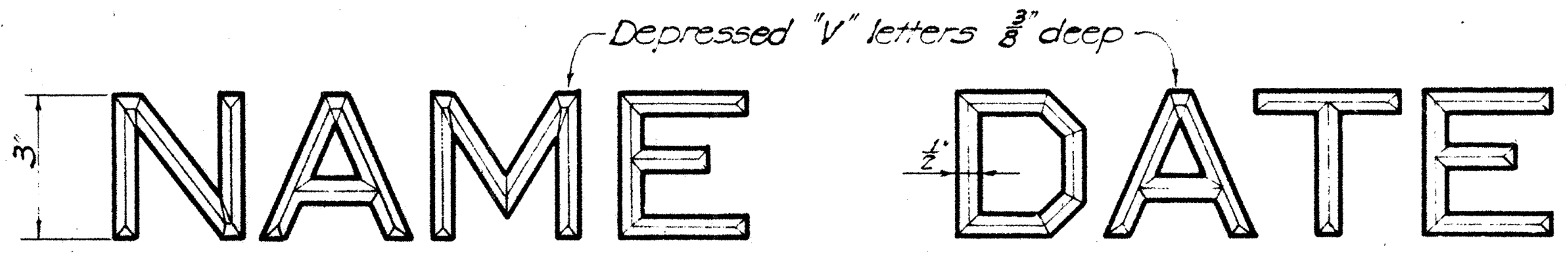
STANDARD DETAILS
STEEL RAILING

Scale as Noted

SHEET No. S-4 OF SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(4)	1963	183	217

Feb. '56
May '56
Aug. '56
Jan. '57
Aug. '57
Jan. '58
May '59
Sept. '59
July '60
Sept. '60
Jan. 62
May 62

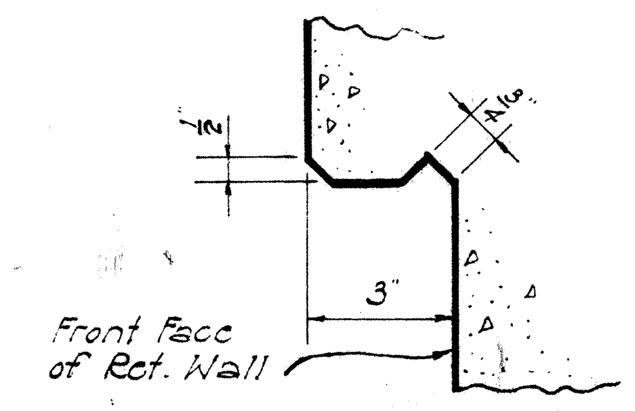

Depressed "V" letters 3/8" deep
3"
1/2"
NAME
DATE

Use correct name of bridge
LEFT HAND SIDE

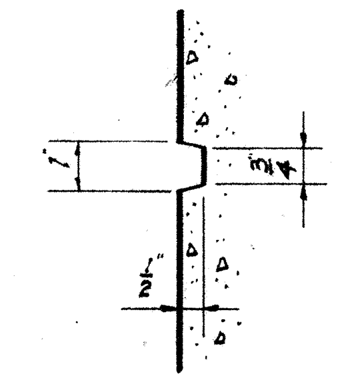
Date of year built.
RIGHT HAND SIDE

DETAIL OF LETTERS AND FIGURES AT BOTH APPROACHES

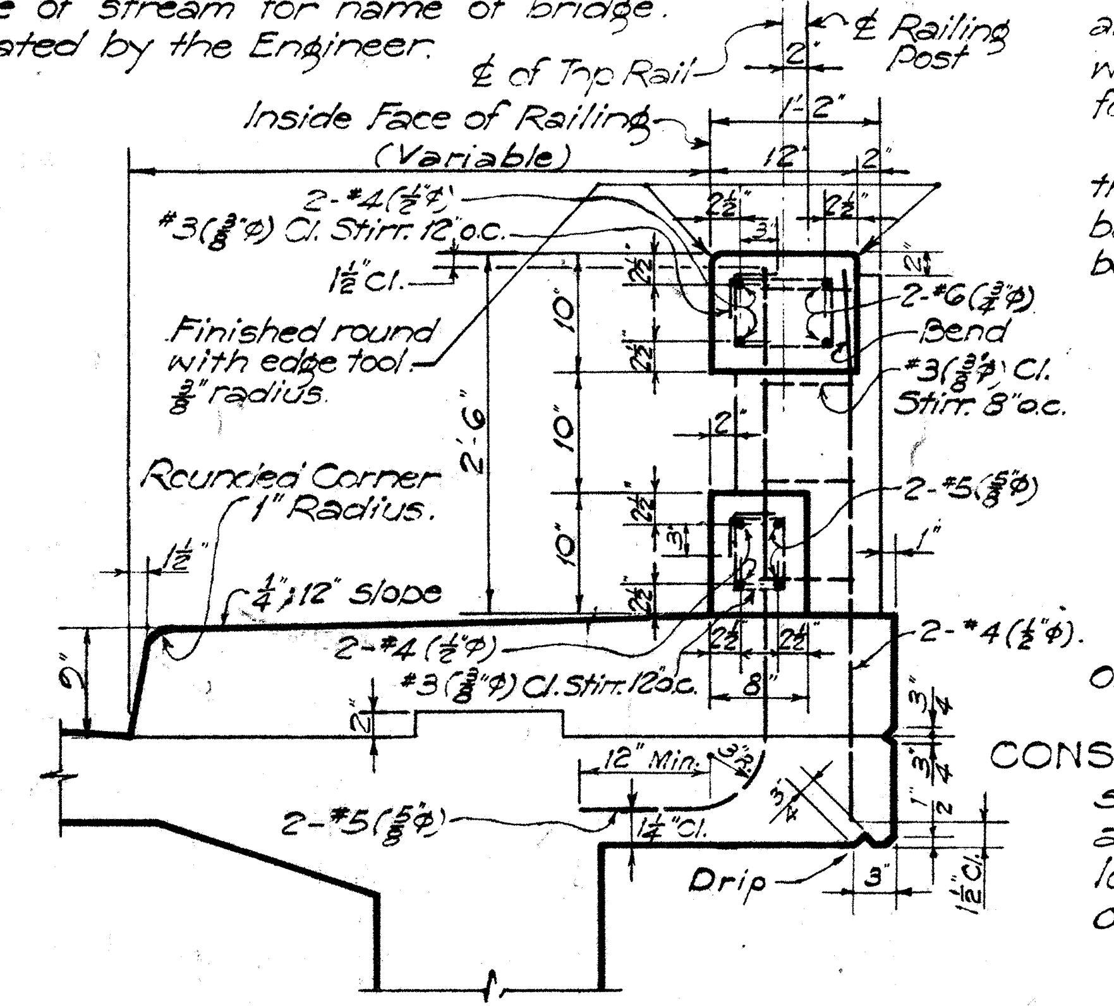
NOTE: *Name of bridge to be placed in left end post panels and date in right post panels on entering bridge using modified block letters 3" in height. In case of stream crossings use name of stream for name of bridge. For all others use name as designated by the Engineer.*


Front Face of Ret. Wall
3"

DRIP DET. FOR RET. WALL
Scale - 3" = 1'-0"

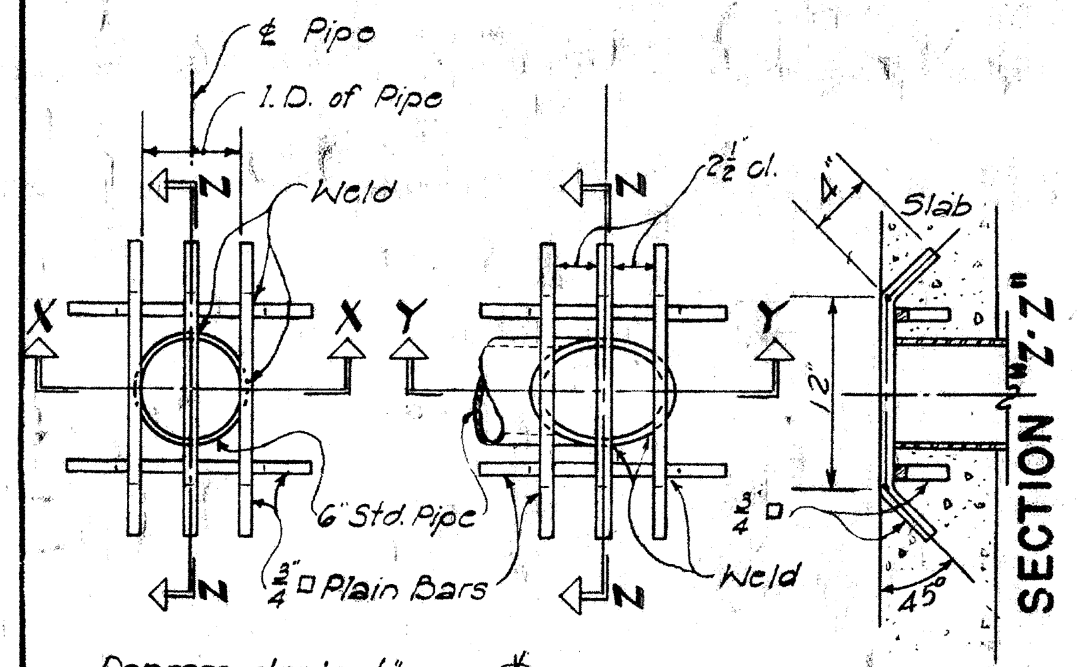


END POST GROOVE DET.
Scale - 3" = 1'-0"

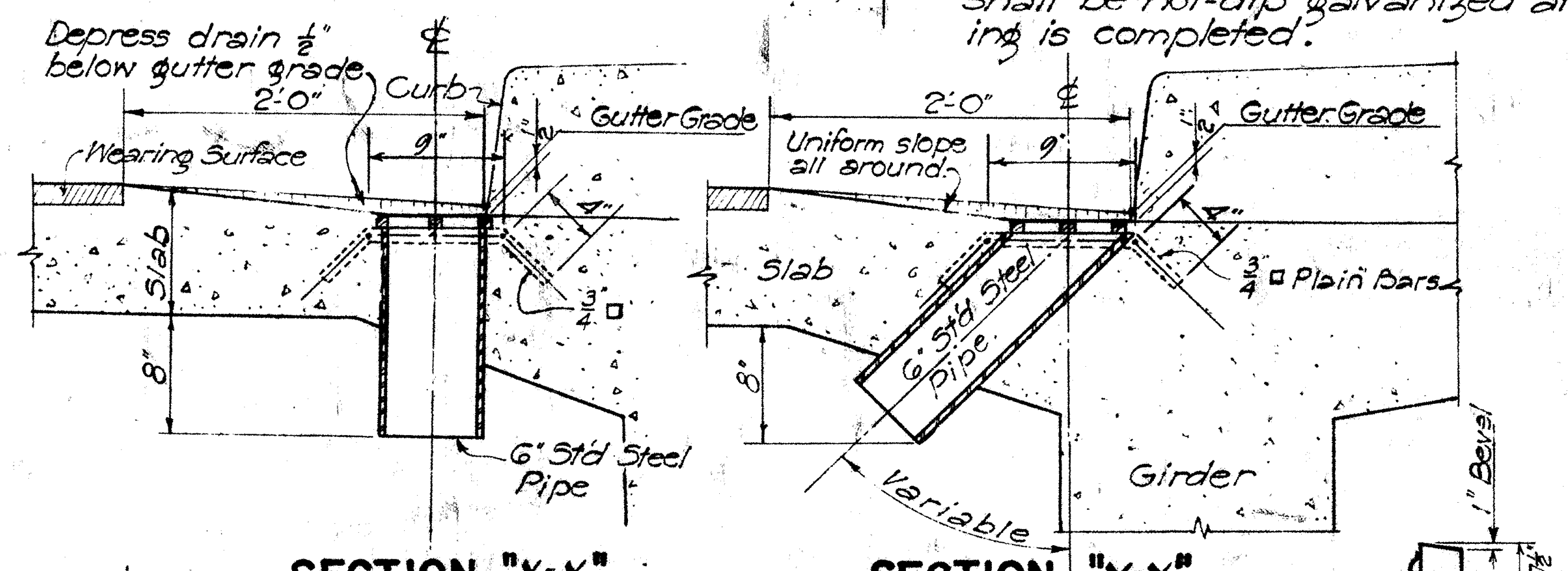

℄ of Top Rail
℄ Railing Post
Inside Face of Railing (Variable)
1'-2"
12"
2"
2-#4(1/2"φ)
#3(3/8"φ) Cl. Stirr. 12" o.c.
1 1/2" Cl.
2-#6(3/4"φ)
Bend
#3(3/8"φ) Cl. Stirr. 8" o.c.
Finished round with edge tool 1/8" radius.
Rounded Corner 1" Radius.
2-#5(5/8"φ)
1/4":12" slope
2-#4(1/2"φ)
#3(3/8"φ) Cl. Stirr. 12" o.c.
2-#5(5/8"φ)
12" Min.
Drip
2'-6"

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

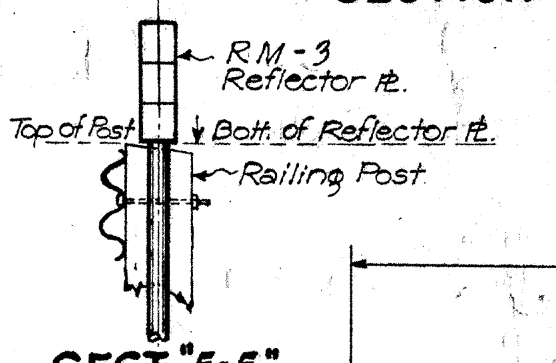
NOTE! *Sidewalk, curb and railing to be poured after release of falsework. Forms for railing and endpost to be made of plywood.*
SURFACE FINISH: The surface of the concrete railings shall be given a Class 2 Rubbed Finish as specified under Subarticle 46.3 (O)(3) of Section 46 Concrete of the Standard Specifications.


℄ Pipe
I.D. of Pipe
Weld
6" Std. Pipe
3/4" □ Plain Bars
Weld
2 1/2" Cl.
Slab
45°
X
Y
Z
SECTION "Z-Z"

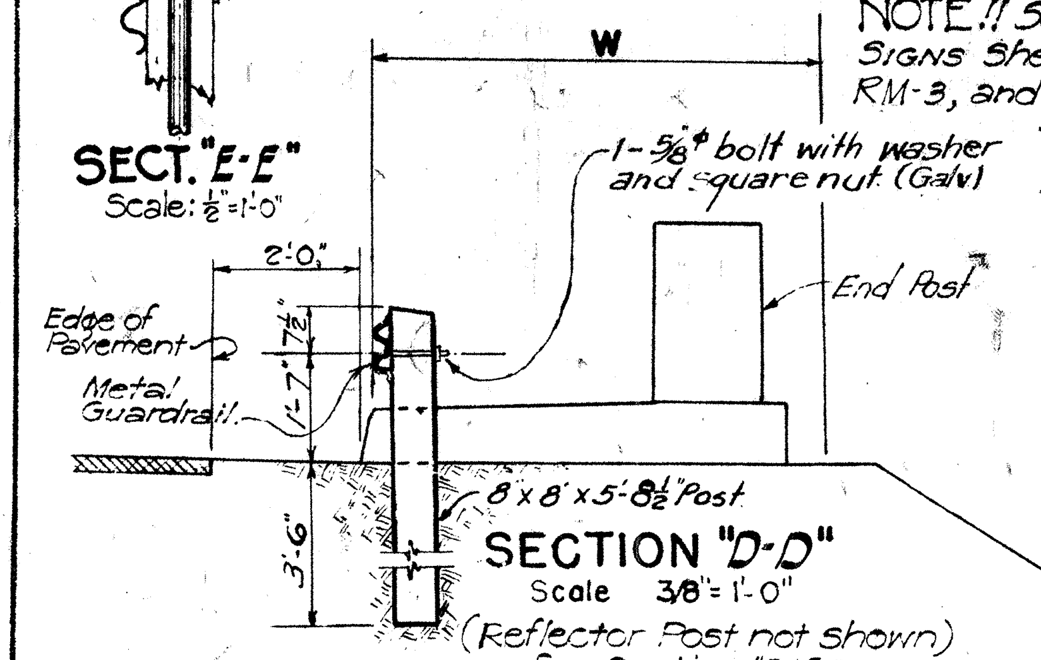
NOTE! *Metal drains shall be considered incidental to Class A-1 Concrete in both concrete and steel bridges and will not be paid for separately.*
Assemblage of grillage and pipe shall be hot-dip galvanized after all welding is completed.


Depress drain 1/2" below gutter grade
2'-0"
Curb
Gutter Grade
Wearing Surface
Slab
6" Std. Steel Pipe
Uniform slope all around
Gutter Grade
3/4" □ Plain Bars
6" Std. Steel Pipe
Girder
Variable
SECTION "X-X"
SECTION "Y-Y"

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

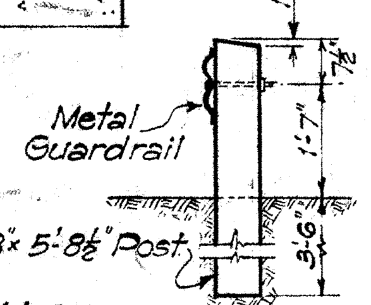

RM-3 Reflector Plt.
Top of Post
Bolt of Reflector Plt.
Railing Post

SECT. "E-E"
Scale: 1/8" = 1'-0"


W
1-5/8"φ bolt with washer and square nut (Galv)
End Post
2'-0"
Edge of Pavement
Metal Guardrail
8"x8"x5'-8 1/2" Post
3'-6"

SECTION "D-D"
Scale 3/8" = 1'-0"
(Reflector Post not shown) See Section "E-E".

NOTE!! *See REGULATORY & WARNING SIGNS Sheet for details of RM-3, and railing posts.*
See Std. Details Sheet for reinforcement of conc. posts.


Metal Guardrail
1" Bevel
7 1/2"
1'-7"
3'-6"
8"x8"x5'-8 1/2" Post

SECT. "F-F"

GENERAL NOTES

CONCRETE: *Class of concrete to be used in different parts of the structure are as noted on plans.*

REINFORCING STEEL: *All reinforcing steel shall be Billet Steel Bars A.S.T.M. A15 intermediate grade.*

Steel shall be made by the open-hearth or Electric Furnace Process. Mill certificate shall be required.

Deformations shall conform to A.S.T.M.-A305

Splicing of reinforcing other than in main deck slab, girder and frame bars shall be done as shown in above sketch except where shown otherwise. Splices are to be staggered. Splices in main girder and frame bars are permitted only in bars exceeding 60'-0" in length at points to be indicated by the Engineer. These splices to be electrically are welded according to detail and specifications. No allowance will be made in the quantities for extra weight of steel required for splices not shown on the plans.

Minimum spacing between parallel bars shall be 2 1/2 times the diameter of bars, but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate.

All dimensions relating to reinforcing are to centers of bars unless otherwise noted.

CONSTRUCTION JOINTS: *All construction joints to have surface roughened and 1:2 cement grout applied immediately before the second pour. Construction joints to be located at places indicated in the plans. See Sec. 46.3F(3) of the "Standard Specifications."*

ELLIPSE COORDINATES

Top of Post

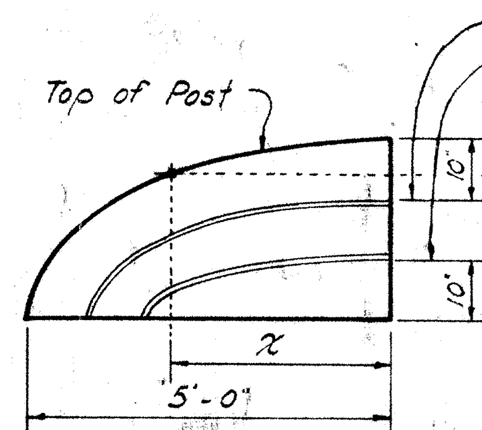
x	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-3"	4'-6"	4'-9"	4'-10 1/2"	5'-0"
y	2'-6"	2'-5 3/8"	2'-4 5/8"	2'-3 1/2"	2'-2"	2'-0"	1'-9 7/16"	1'-6"	1'-3 13/16"	1'-1 1/16"	9 3/8"	6 11/16"	0

Top Line of Upper Groove

x	0	6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-1"	4'-2"
y	1'-8"	1'-7 7/8"	1'-7 7/16"	1'-6 11/16"	1'-5 9/16"	1'-4"	1'-1 7/8"	1'-0 1/2"	10 7/8"	8 11/16"	5 5/8"	4"	0

Bot. Line of Lower Groove

x	0	6"	1'-0"	1'-6"	2'-0"	2'-6"	2'-9"	3'-0"	3'-2"	3'-3"	3'-4"		
y	10"	9 7/8"	9 9/16"	8 15/16"	8"	6 5/8"	5 5/8"	4 3/8"	3 1/8"	2 1/4"	0		

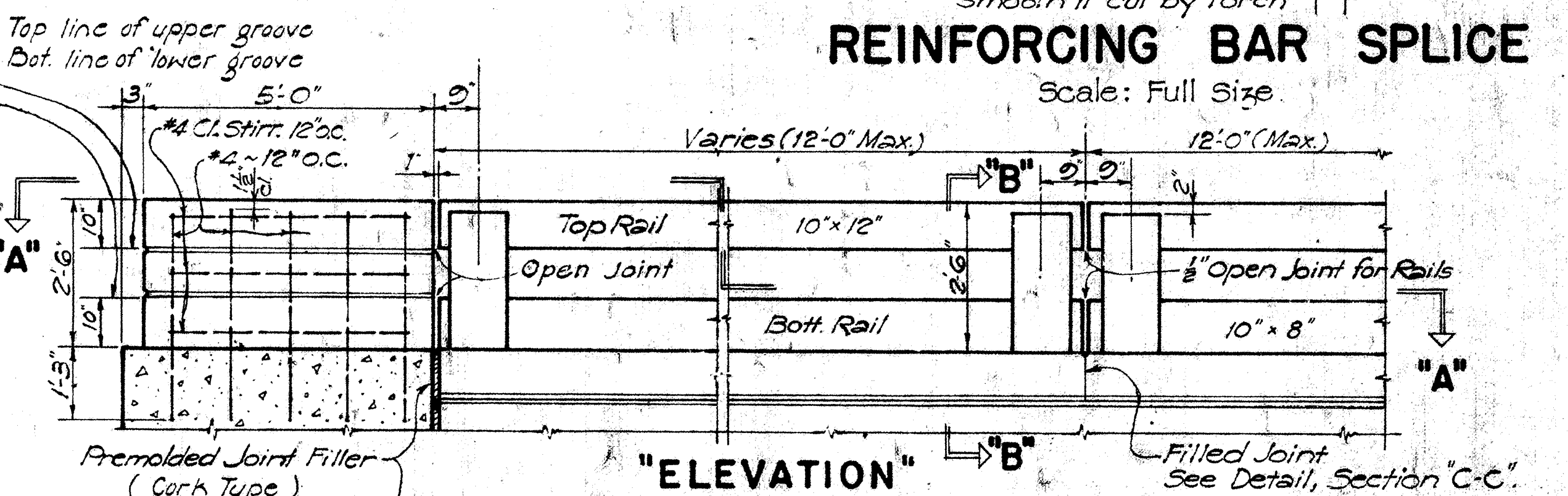

Top of Post
Top line of upper groove
Bot. line of lower groove
10"
2'-6"
x
5'-0"

ELLIPTICAL CURVE AT END POST

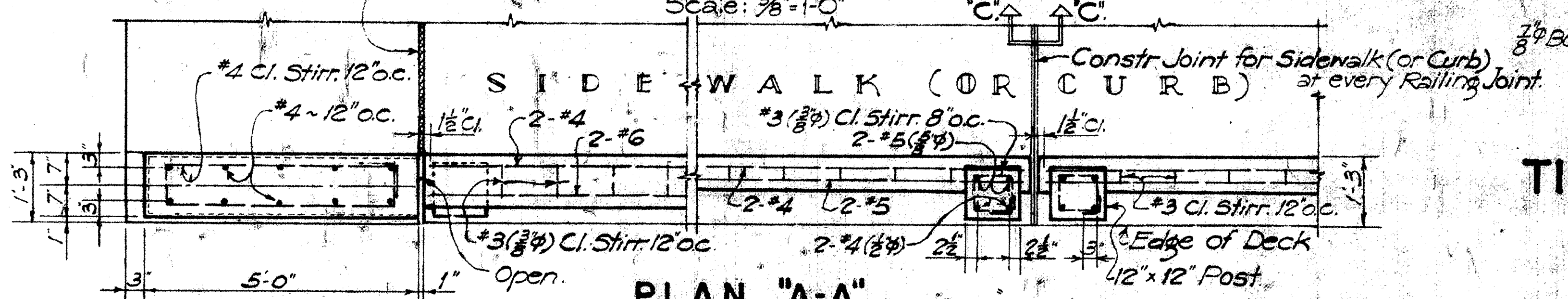
GUARDRAIL OFFSET

X	Y					
	W=3'	W=4'	W=5'	W=6'	W=7'	W=8'
12.5	0.19'	0.16	0.14	0.12	0.09	0.08
25.0	0.75	0.64	0.55	0.49	0.35	0.32
37.5	1.69	1.44	1.25	1.10	0.78	0.72
50.0	3.00	2.56	2.22	1.96	1.38	1.28
62.5		4.00	3.47	3.06	2.16	2.00
75.0			5.00	4.41	3.11	2.88
87.5				6.00	4.23	3.92
100.0					5.53	5.12
112.5					7.00	6.48
125.0						8.00

W = Guardrail flare
X = Distance from post at bridge to offset points.
Y = Guardrail flare offset

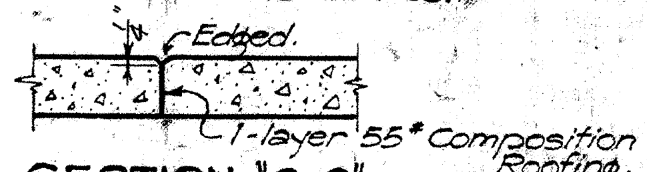

Top line of upper groove
Bot. line of lower groove
3"
5'-0"
9"
#4 Cl. Stirr. 12" o.c.
#4-12" o.c.
Varies (12'-0" Max.)
12'-0" (Max.)
"B"
"A"
Top Rail
Open Joint
10"x12"
1/2" Open Joint for Rails
Bott. Rail
10"x8"
Premolded Joint Filler (Cork Type)
Filled Joint See Detail, Section "C-C".

"ELEVATION"
RAILING AND END POST DETAIL
Scale: 3/8" = 1'-0"

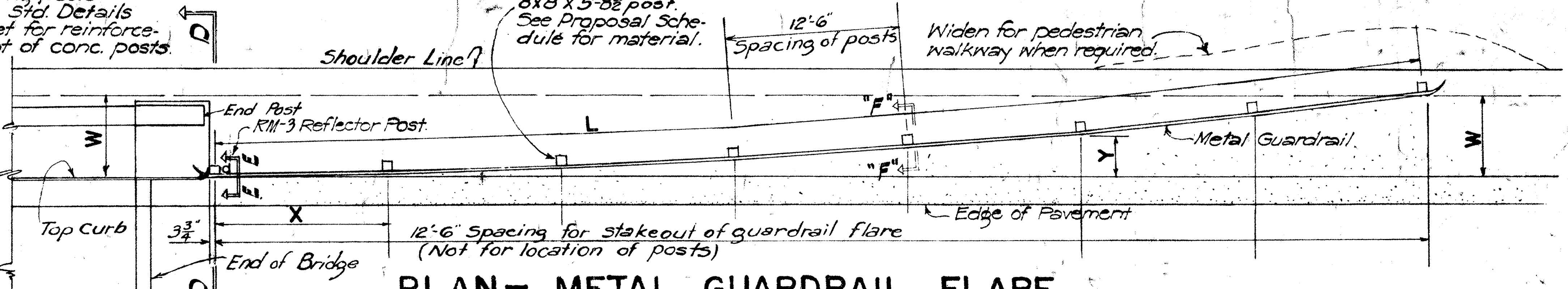

"C" "C"
Constr. Joint for Sidewalk (or Curb) at every Railing Joint.
SIDEWALK (OR CURB)
#4 Cl. Stirr. 12" o.c.
#4-12" o.c.
2-#4
2-#6
#3(3/8"φ) Cl. Stirr 8" o.c.
2-#6(3/4"φ)
#3 Cl. Stirr. 12" o.c.
Edge of Deck
1/2"x12" Post
#3(3/8"φ) Cl. Stirr. 12" o.c.
Open.
5'-0"
1'-3"

PLAN "A-A"

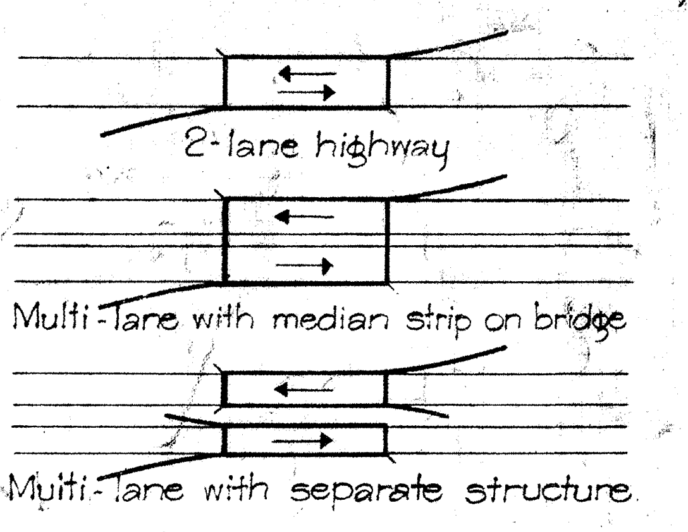
TOP RAIL ~ *Bottom forms for top rails shall be kept in place a minimum of 14 days from date of pour.*

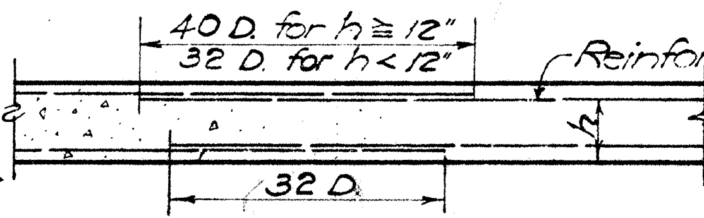

Edged.
1-layer 55# Composition Roofing.

SECTION "C-C"

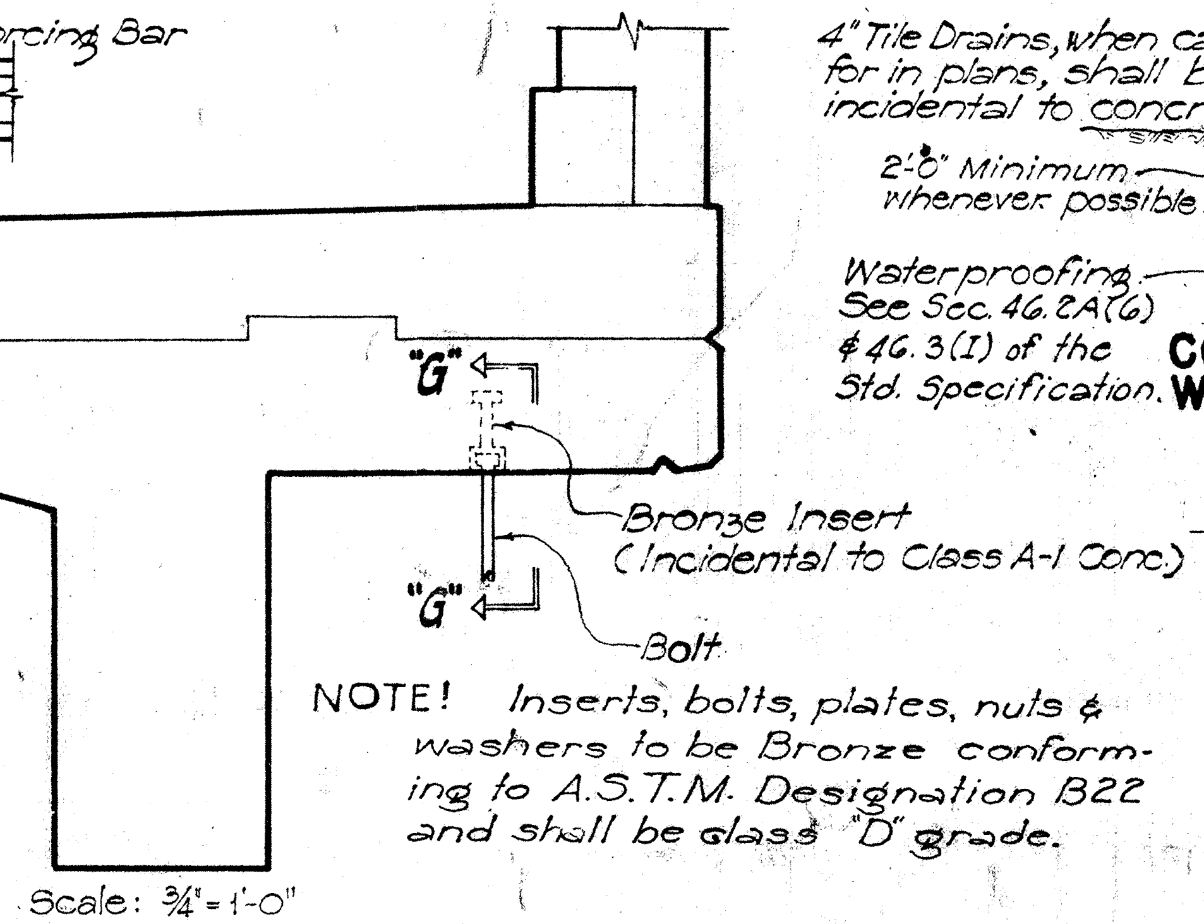

8"x8"x5'-8 1/2" post. See Proposal Schedule for material.
12'-6" Spacing of posts
Widen for pedestrian walkway when required.
Shoulder Line
End Post
RM-3 Reflector Post
L
"F"
Metal Guardrail
W
Y
X
Top Curb
3 1/2"
12'-6" Spacing for stakeout of guardrail flare (Not for location of posts)
Edge of Pavement
End of Bridge
D

PLAN– METAL GUARDRAIL FLARE
Scale 1/8" = 1'-0"

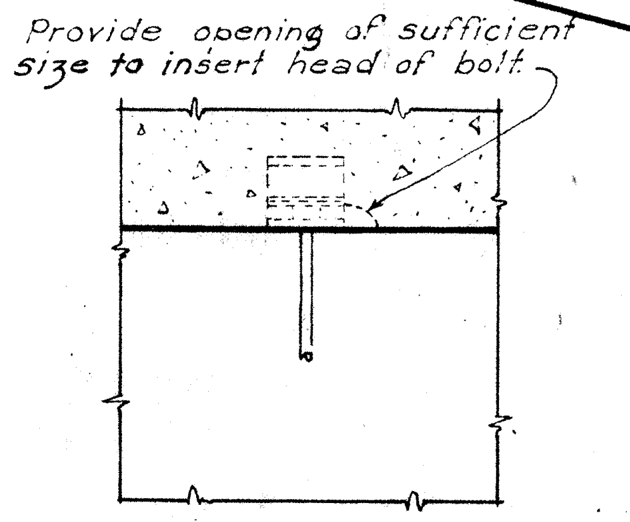

2-lane highway
Multi-lane with median strip on bridge
Multi-lane with separate structure


40 D for h ≥ 12"
32 D for h < 12"
Reinforcing Bar
32 D

LAP DETAIL
(In columns and walls lap bars 32 Dia.)

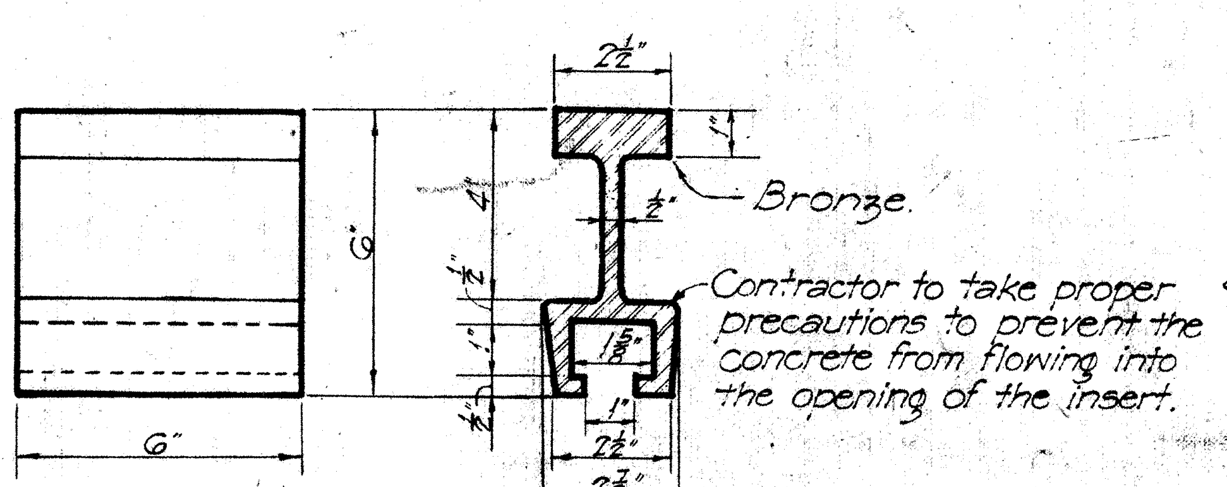

"G"
"G"
Bronze Insert (Incidental to Class A-1 Conc.)
Bolt

NOTE! *Inserts, bolts, plates, nuts & washers to be Bronze conforming to A.S.T.M. Designation B22 and shall be class 'D' grade.*


Provide opening of sufficient size to insert head of bolt.
Scale: 3/4" = 1'-0"

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

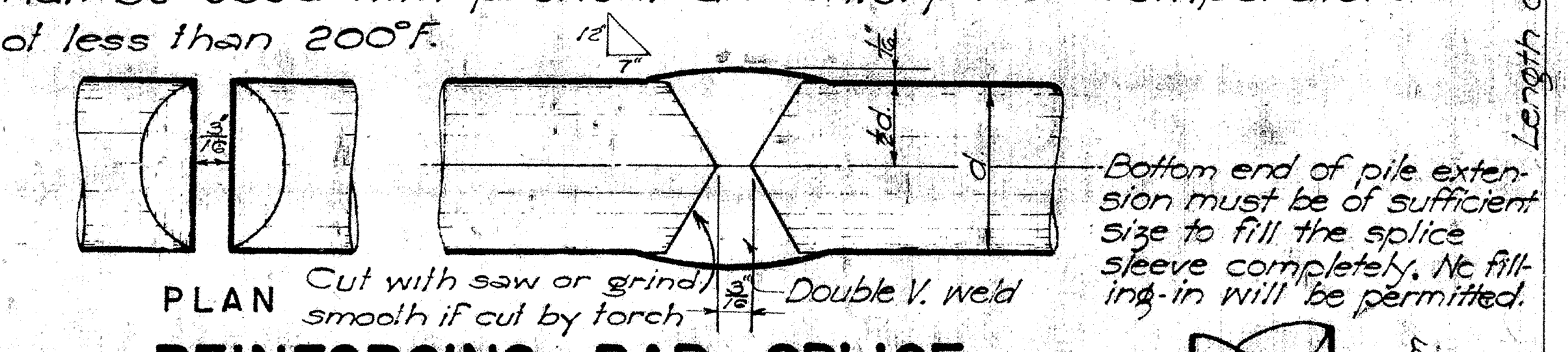
JOINT FILLER: *Joint filler, when called for in plans, shall be incidental to concrete and will not be paid for separately.*


2 1/2"
1"
Bronze.
1/2"
6"
4"
Contractor to take proper precautions to prevent the concrete from flowing into the opening of the insert.
1 5/8"
1"
2 1/2"
2 7/8"
6"

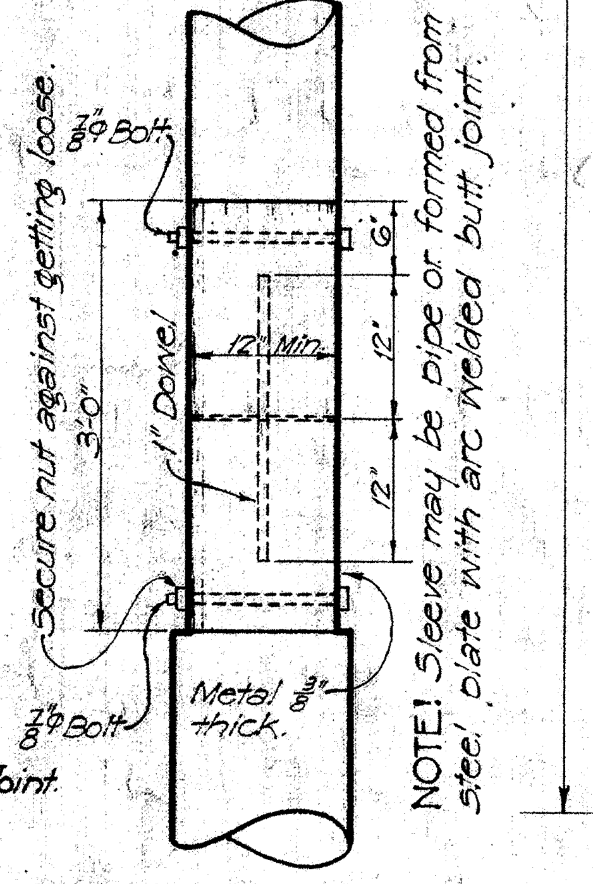
INSERTS
Scale: 3/4" = 1'-0"

DETAIL OF PIPE HANGERS AND INSERTS

NOTE!
Carbon content of reinforcing bars for welding shall not be over 0.40%. Low hydrogen electrodes E7015 or E7016 shall be used with preheat and interpass temperature not less than 200°F.


12
7"
3/16"
1/16"
1/2 d
d
PLAN
Cut with saw or grind smooth if cut by torch
3/16"
Double V. weld
Bottom end of pile extension must be of sufficient size to fill the splice sleeve completely. No filling-in will be permitted.

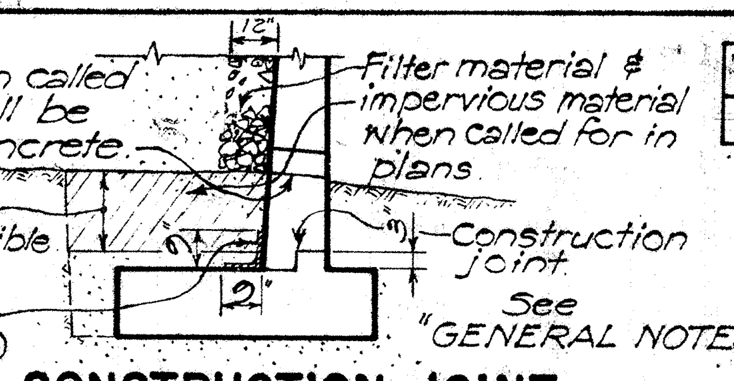
REINFORCING BAR SPLICE
Scale: Full Size


3/4" Bolt
Secure nut against getting loose
1" Dowel
12" Min.
Metal 3/8" thick
3/4" Bolt
Sleeve may be pipe or formed from steel plate with arc welded butt joint.

TIMBER PILE SPLICE
Scale: 3/4" = 1'-0"

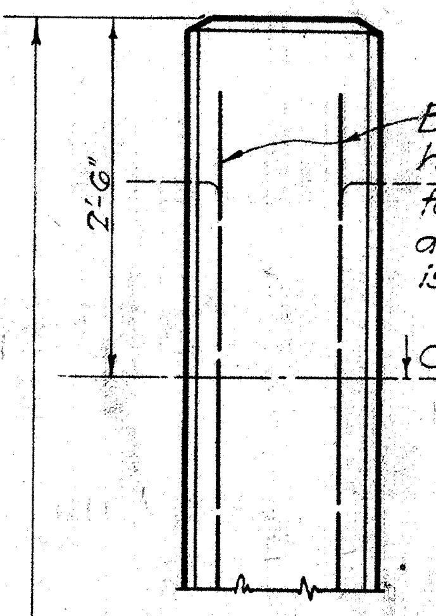
GENERAL NOTE

Except where detailed otherwise in the plans, all details on this sheet govern.

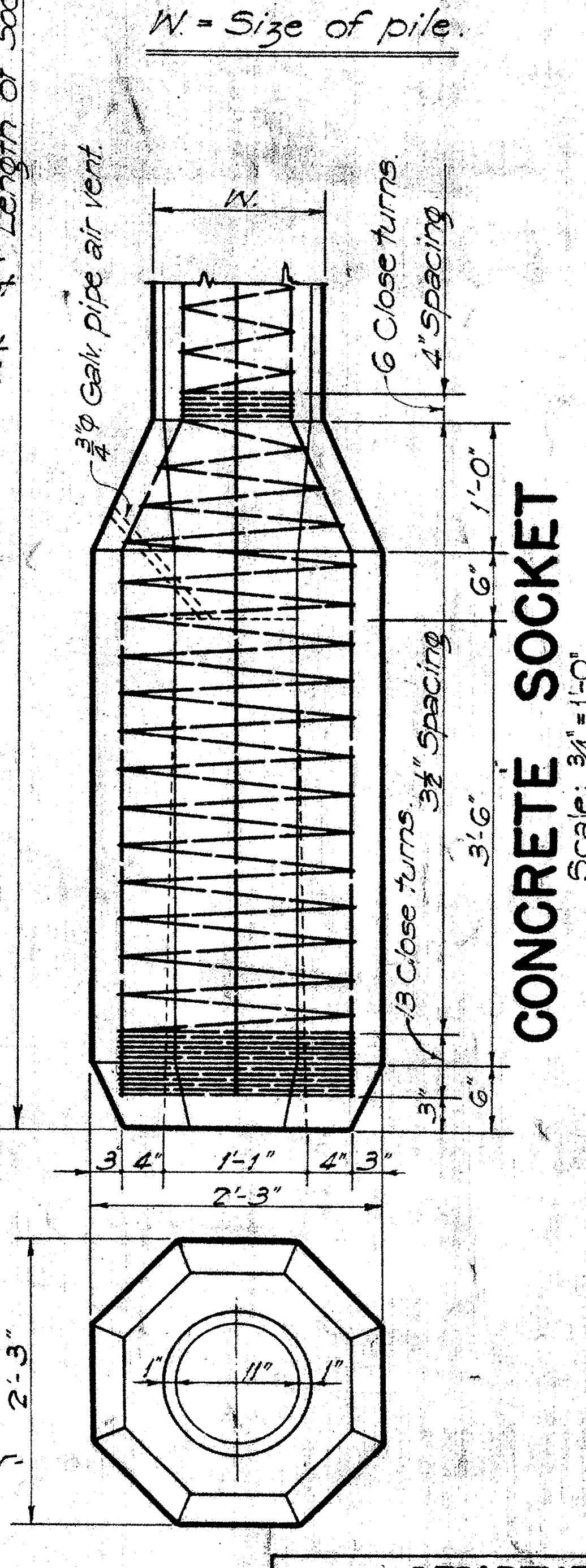

12"
2'-0" Minimum whenever possible
Construction joint.
2"

4" Tile Drains, when called for in plans, shall be incidental to concrete.
Filter material & impervious material when called for in plans.
Waterproofing. See Sec. 46.2A(6) & 46.3(I) of the Std. Specification.
See "GENERAL NOTES"

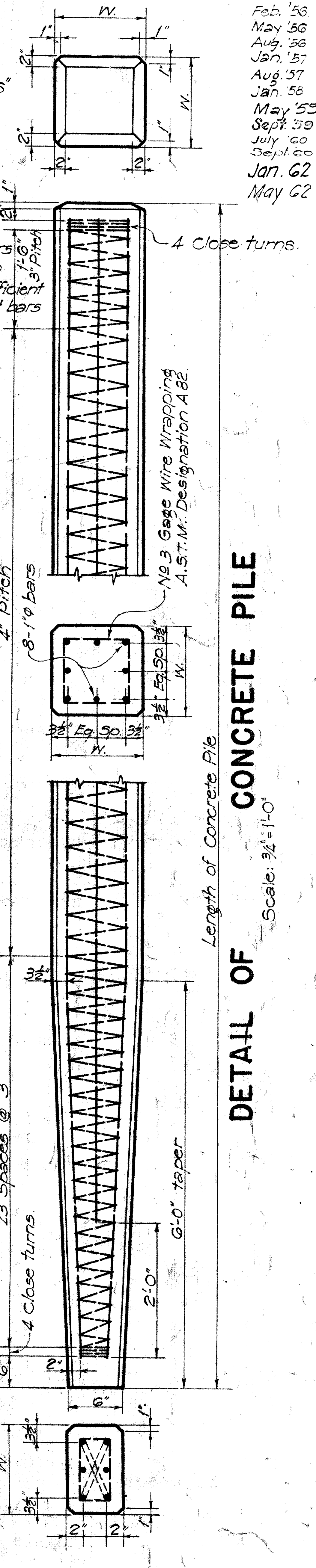
CONSTRUCTION JOINT, WATERPROOFING AND WEEPHOLES.


2'-6"
Bend ends of bars horizontally into footing where sufficient depth for straight bars is not available.
Cutoff elevation

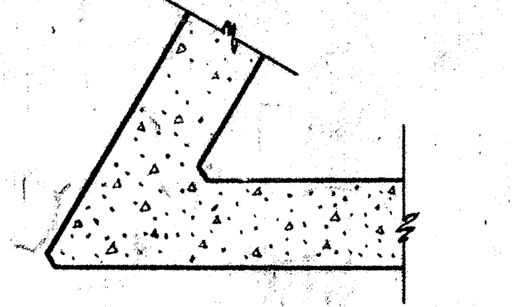
PILE CUTOFF


W = Size of pile
W
3/4" Galv. pipe air vent.
Length of Socket Pile.
6 Close turns
4" Spacing
3/4" Spacing
13 Close turns
3'-6"
3'-0"
1'-0"
6"
3 4" 1'-1" 4" 3
2'-3"
2'-3"
1" 11" 1"

CONCRETE SOCKET
Scale: 3/4" = 1'-0"


W.
1"
2"
W.
1'-6"
3" Pitch
4 Close turns.
4" Pitch
8-1"φ bars
No. 3 Gage Wire Wrapping A.S.T.M. Designation A82
3 1/2 Eq. Sp. 3 1/2
23 Spaces @ 3"
6'-0" taper
4 close turns
2'-0"
Length of Concrete Pile
6"
2"
3 1/2"

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



Unless otherwise noted all sharp corners and re-entrant angles in concrete work shall be chamfered. See Section 46.3(C) of the Standard Specifications. Chamfer to be 3/4"

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD BRIDGE DETAILS

Scales as Noted
APPROVED BY: ______
STATE HIGHWAY ENGINEER
DATE: Aug. 26, 1959

SHEET № S-5 OF SHEETS

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ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY W. R. Bartels	"
	DRAWN BY	"
NOTE BOOK No.	TRACED BY R. Kawamura	" Mar. 1949
	QUANTITIES BY	"
	QUANTITIES CHECKED BY	"
	CHECKED BY	"